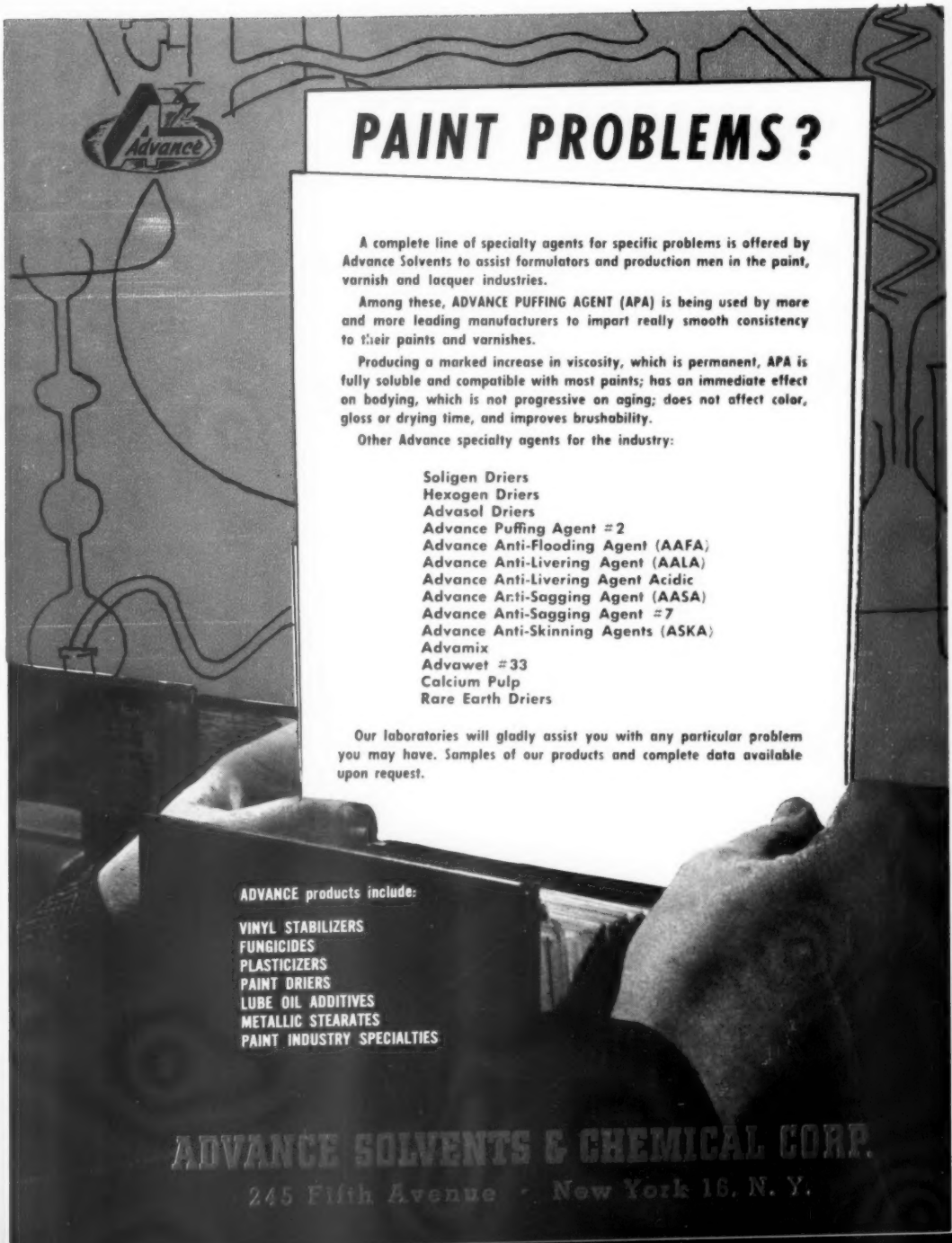
PAINT and VARNISH Production

THE TECHNICAL MAGAZINE FOR MANUFACTURERS OF PAINT, VARNISH, LACQUER AND OTHER SYNTHETIC FINISHES


Advance
PAINT PROBLEMS?
A complete line of specialty agents for specific problems is offered by Advance Solvents to assist formulators and production men in the paint, varnish and lacquer industries.
Among these, ADVANCE PUFFING AGENT (APA) is being used by more and more leading manufacturers to impart really smooth consistency to their paints and varnishes.
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Advance Anti-Sagging Agent (AASA)
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Advamix
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Calcium Pulp
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Our laboratories will gladly assist you with any particular problem you may have. Samples of our products and complete data available upon request.
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PAINT DRIERS
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METALLIC STEARATES
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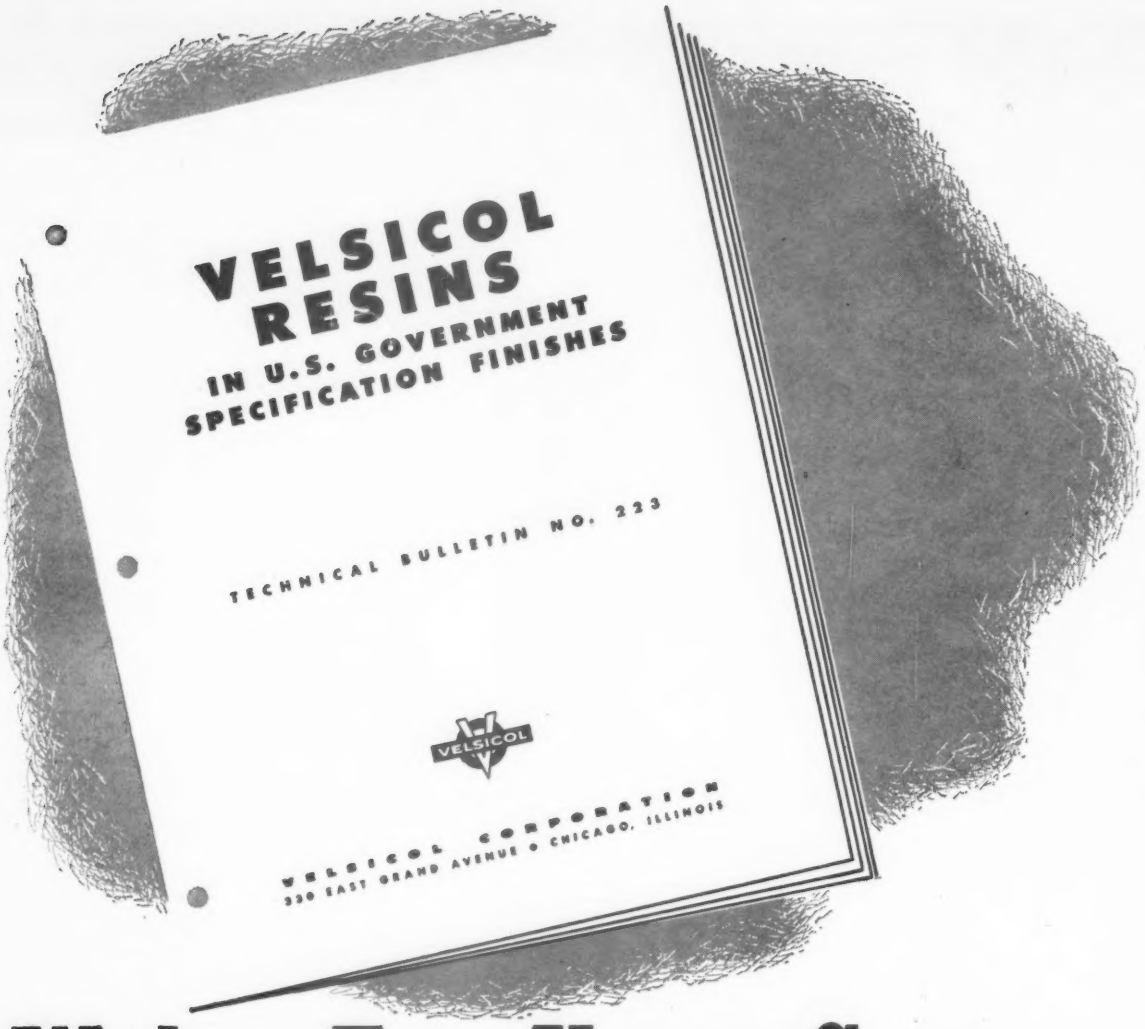
ADVANCE SOLVENTS & CHEMICAL CORP.
245 Fifth Avenue · New York 16, N. Y.

AUGUST
1952



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TT-S-176a	JAN-F-495
TT-V-71b	MIL-V-1174
TT-V-81b	52-MC-301
TT-V-86	52-MC-304
TT-V-121c	52-MC-401

We believe that you will find this interesting booklet of assistance and value in solving your formulating problems. The Velsicol Resins offer marked economies from the standpoint of raw material cost, as well as in performance characteristics. Write for your copy.

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PETROLEUM DERIVED CHEMICALS
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SERVING BASIC INDUSTRIES

PAINT and VARNISH Production

Formerly PAINT and VARNISH PRODUCTION MANAGER
(Established in 1910 as The Paint and Varnish Record)

VOL. 42 AUGUST, 1952 NO. 8

NEXT ISSUE

Surface chemistry is one of the more important factors in paint technology. Most of this surface chemistry has been in conjunction with the alteration of vehicles to beneficially affect the interfacial contacts of vehicle and pigment.

In this connection we have scheduled in next month's issue a paper dealing with a pigment particle surface. The author presents considerable data obtained from such procedures as light microscopy, x-ray studies, electron diffraction, settling tests, phase microscopy, and pigment extraction.

FEATURES

Protective Coating Research by the Corps of Engineers 15

Chemical Engineering in Alkyd Resin Manufacture, *by Stanley Yokell* 21

Extractive Crystallization, *by Philip Heilberger* 26

Manufacturing Latex Paints 30

DEPARTMENTS

Comment 7

New Products 31

News Digest 35

Patents 41

Calendar 48

Personnel Changes 49

Angles and Curves in the Paint Industry 50

Technical Bulletins 54

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*Reg. U.S. Pat. Off.

Production Control

THE IMPORTANCE of adequate production control in the paint industry cannot be overemphasized for good production control contributes in many ways to the success of a company.

In a recent circular "Management Aids for Small Business" issued by the Dept. of Commerce, ways and means to effect good production control in the small plant are presented. Since the bulk of the paint industry is composed of small plants, principles laid down in this circular may very well be applied by those seeking improvements in the operation of their particular plant.

The circular points out that basically you must know four things in order to control and operate your plant effectively. You must know what the plant is capable of producing; how much work remains to be completed in order to fill current orders; what work is anticipated for the future; and what materials, supplies and equipment are needed.

The actual form that the production control should take depends upon the size of the company and the nature and variety of its products.

In a very small plant, say one of 10-20 men, the plant operator might keep the necessary production knowledge in his head, run the plant on verbal orders, and supplement these instructions with only enough paper work and records to purchase materials and bill the customers. He would know the shop conditions, the men, and the products. He could use his best judgement to quickly adapt plans and schedules to changing conditions. If a machine broke down, he would know it immediately and could evaluate the effect on delivery promises and quickly decide upon a course of action.

This method is fine as long as the plant operator continued to maintain close contact with all the elements of controlling production.

As the plant continued to produce successfully, and the demand grew for its products and for new products, problems of managing the company would multiply. Then, the production control and other functions carried on by one man would begin to break down.

As plant operations become more complex, effective production control depends upon a knowledge of the "facts of production," good organization, and sound judgement. Production control starts with planning and scheduling and ends when the plans and schedules are carried out successfully. Therefore, it is important that sound judgement be used in developing the plans and schedules and that they be based on facts and on a knowledge of what must be done.

In planning and scheduling, there are a few principles which will go a long way to insure effective production control.

First it is essential to plan. Planning falls into two categories; forecast planning and preparation planning. In forecast planning, the sales volume in units and dollars is laid out by contracts, types of production, and shipping periods. This plan indicates both actual orders and forecasted orders. Preparation planning deals with the preparation of instructions and facilities for production.

It follows therefore, that consideration must be given to raw materials. Some materials can be acquired on fairly short notice, others cannot. The different times required to obtain materials must be considered in planning production.

In scheduling production orders such, information as quantity and date wanted are necessary. These instructions, plus the date when the materials and equipment will be available provide the details needed to schedule the work through production.

The greatest value of production control comes during times of change for it is in these periods that risks to the plant are greatest. During a period when a plant is expanding or decreasing volume, shifting lines of products, adding or discontinuing products, or making changes, production control provides a better balance of the components going into the products. When business is expanding and the emphasis is on producing more or new products, production control helps to get the work out. When orders fall off and cost is uppermost in management's mind, production control helps in keeping inventories and the work force in balance with the demand for the product.

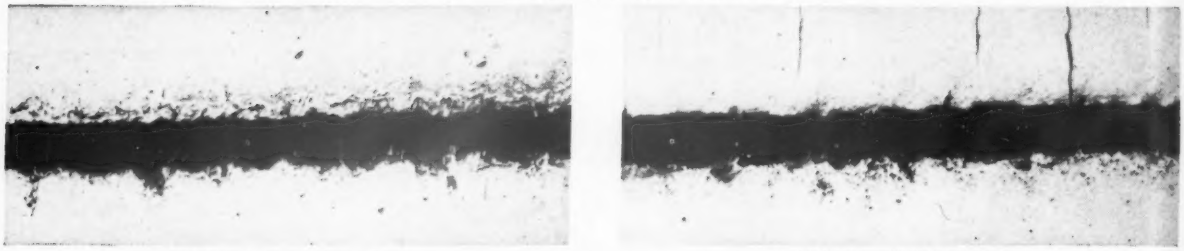
WHITE LEAD PRIME COATS improve paint systems

Weathering tests on saw-cut panels prove that white-lead-base primers, used in two coat house paint systems, improve adhesive and water resistant qualities and lengthen protective and decorative life.

The test panels show how, after one year's exposure to Long Island's erratic weather conditions, the system with the white-lead-base primer has maintained its film integrity and adhesion and that the finish coat formulation is not as suitable as a primer.

No stronger or more convincing argument can be given for using white lead pigment in your primer formulations; and certainly, no customer could ask for better proof of the protection of white lead primers in his house paint systems. For information on the most effective use of "lead" in your paints, write for "White Lead in Mixed Pigment House Paints," and "White Lead Technical Bulletin #1." *Lead Industries Association, 420 Lexington Avenue, New York 17, New York.*

In this comparative weathering test, a commercial, lead-base, finish paint, was applied, self-primed, to a cedar panel (right). The panel on the left has a topcoat of the same finish paint but it has been applied over a typical, white lead-base, multiple pigment primer. On both panels the edges were thoroughly sealed with two coats of L.I.A. primer P-4. Cross grain saw cuts were subsequently made two inches into the panels from one edge. The panels were then exposed 45 deg. south vertical at Sayville, Long Island, New York.



Finish Paint on Primer Base (MAGNIFICATION 4X) Self Primed Finish Paint

The photographs show the film cracking effect moisture has on the self primed house paint system as compared to the protection given by white lead base paint, formulated as a primer.

"LEAD" LENGTHENS THE LIFE OF PAINT BECAUSE:

It Stabilizes . . . neutralizes acidic compounds resulting from decomposition of the vehicle – prevents the film from becoming soft or liquefying.

It Plasticizes . . . forms lead soaps which increase film flexibility.

It Strengthens . . . mechanically reinforces the film, increasing its elastic strength with flexible, spiny lead-soap particles.

It Resists Water . . . reduces water sorption to a small fraction of that of lead-free paints.

It Limits Oil Penetration . . . holds more of the vehicle in the film where it is needed; less in the substrata.

It Prevents Chalking and Inhibits Mildew . . . makes paint look better, longer.

L.I.A. PRIMER P-4*

Pigmentation (64.1%)	Per Cent	lb./100 gal.
White Lead	48.5	473
Rutile Non-Chalking Titanium Dioxide	15.1	148
Magnesium Silicate	35.4	345
Litharge	1.0	10
Total	100.0	
Vehicle (35.9%)	**Per Cent**	
Raw Linseed Oil	34.0	187
VM1767**	21.0	113
VM1693***	10.5	58
Blown Linseed Oil (Z-2)	5.0	27
Driers	0.5	3
Mineral Spirits	29.0	160
Total	100.0	1524

PVC=39.4%

FINISH PAINT

Pigmentation (63.1%)	Per Cent	lb./100 gal.
White Lead	35.0	336
Zinc Oxide	30.0	290
Anatase Titanium Dioxide	15.0	145
Magnesium Silicate	20.0	191
Total	100.0	
Vehicle (36.9%)	**Per Cent**	
Refined Linseed Oil	60.0	336
Bodied Linseed Oil (Z-2)	15.0	84
Mineral Spirits	22.0	124
Driers	3.0	16
Total	100.0	1522

PVC=33%

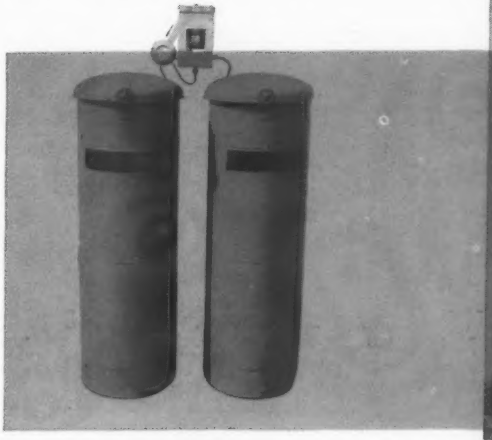
* formula from "White Lead Technical Bulletin #1."

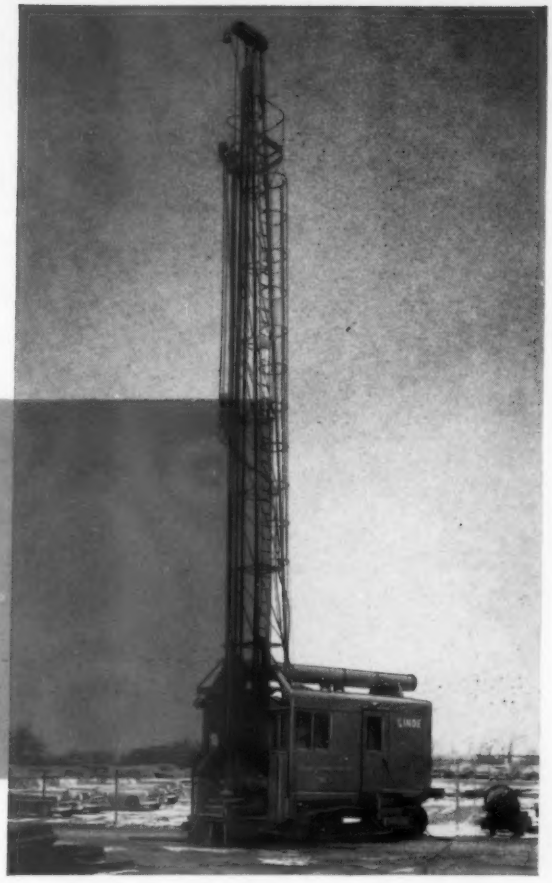
** 60 parts linseed oil; 40 parts dehydrated castor oil, bodied to obtain a viscosity of V. Gardner 70% solids in mineral spirits.

*** 5 gal. length, low acid number ester gum varnish cooked with dehydrated castor oil. Viscosity is B-C Gardner at 59% solids.

1678

Where SURFACE PROTECTION is a problem . . .





FROM BOTTLED GAS INSTALLATION TO ROCK-PIERCING JET

the answer is coatings made with VINYLITE BRAND RESINS

These PYROFAX gas cylinder domes are exposed to year-round weather. In certain coastal areas, ordinary paints covering them disappear in three months. New coatings, based on a primer of VINYLITE Brand Resins, an intermediate coat and a finish coat, have been intact for *two years!*

The LINDE JPM-3 jet-piercing machine shoots a kerosene-oxygen flame that penetrates 30 feet of rock an hour to make blast holes for iron mining. It's exposed to weather, temperature extremes, moisture, flying stone particles, corrosive fumes . . . But coatings based on VINYLITE Brand Resins keep it safe.

Wherever surface protection is a problem—indoors or out—there's a job for coatings based on VINYLITE Resins. Oil refineries, chemical plants, pipe lines, barges, dairies and railroads are only a part of this huge market. And you can get a big share of it by formulating *your* paints with VINYLITE Resins for peak service.

Properly applied by competent contractors, such coatings give peak service under the toughest conditions. They stick fast to metal, concrete or masonry... won't chip, crack, peel or fade with use. They have a wide range of colors. They're extremely inert, odorless and tasteless, excellent for packaging applications.

You'll get bigger, more profitable jobs by offering the bigger savings that these coatings bring. They have the unique properties that make VINYLITE Resins and Plastics so useful throughout defense and basic industry. Write Dept. NL-75

Data courtesy Stanley Chemical Co., East Berlin, Conn.

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News about

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DIP INTO THESE HYCAR LATEX PROPERTIES —FOR PAINT FORMULATION IDEAS!

● Hycar latex is used as a pigment binder in many fields —has properties that you may find highly useful in developing or improving paint formulations. Check the advantages listed—if they give you ideas, we'll be glad to help. Write Dept. HS-8, B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio. In Canada: Kitchener, Ontario. Cable address: Goodchemco.

- Non-tacky
- Heat resistance
- Adhesive properties
- Excellent pigment binder
- Solvent and oil resistance
- Abrasion resistance
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ASP

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INERT PIGMENTS THAT IMPROVE YOUR PRODUCT

EDGAR ASPs STAY IN SUSPENSION

ASP 1100 (COATED) | ASP 100 | ASP 400 | MAGNESIUM SILICATE | CALCIUM CARBONATE | CALCIUM CARBONATE (TREATED)

HOW THIS TEST WAS CONDUCTED

In this test all the pigments have, approximately, the same bulking value. The vehicle used is alkali refined Linseed Oil. The samples were ground on a Kent three roll mill . . . all with exactly the same setting. One mill pass was used, and all operations were uniform for all batches. The concentration was two pounds per gallon of paint. Each paint was put in a 4 ounce oil sample bottle and left for fourteen months at which time settling was noted and photographed.

ADD THIS IMPORTANT QUALITY TO YOUR PAINTS WITH EDGAR ASP PIGMENTS

An important feature of EDGAR ASP Pigments, always noted in production and in use, and confirmed by this test, is their suspension property (Both in the can and in the film). Even after excessive settling over long periods of time, paints using EDGAR ASPs are found to have a creamy consistency which is quickly and easily brought into full suspension.

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18 Station Place, Metuchen 4, New Jersey

Please send me the following:

- ⬡ File folder with up to date technical literature
- ⬡ Sample drum of ASP 1100 ⬡ 2 lb. ⬡ 5 lb. ⬡ 10 lb.
- ⬡ Sample drum of ASP 100 ⬡ 2 lb. ⬡ 5 lb. ⬡ 10 lb.
- ⬡ Sample drum of ASP 400 ⬡ 2 lb. ⬡ 5 lb. ⬡ 10 lb.

NAME _____ TITLE _____

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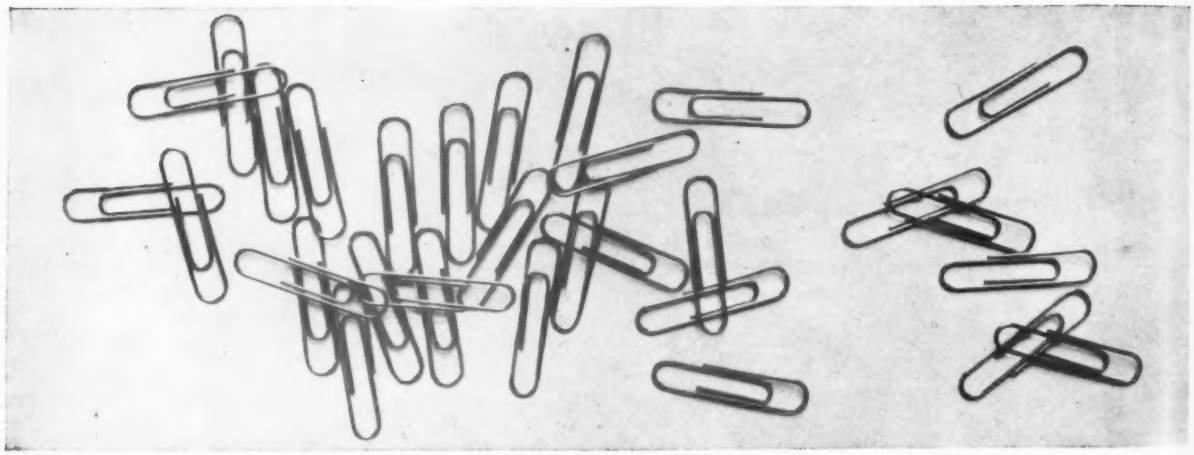
What do paper clips have in common with Barrett* Coal-Tar Solvents?



Uniformity, of course.

When you buy coal-tar solvents, you need *uniformity* at a high level of quality.

When you buy from Barrett, you get *uniform* quality resulting from BARRETT'S BASIC POSITION IN RAW MATERIALS *and* NEARLY 100 YEARS OF EXPERIENCE IN THE MANUFACTURE OF COAL-TAR PRODUCTS.

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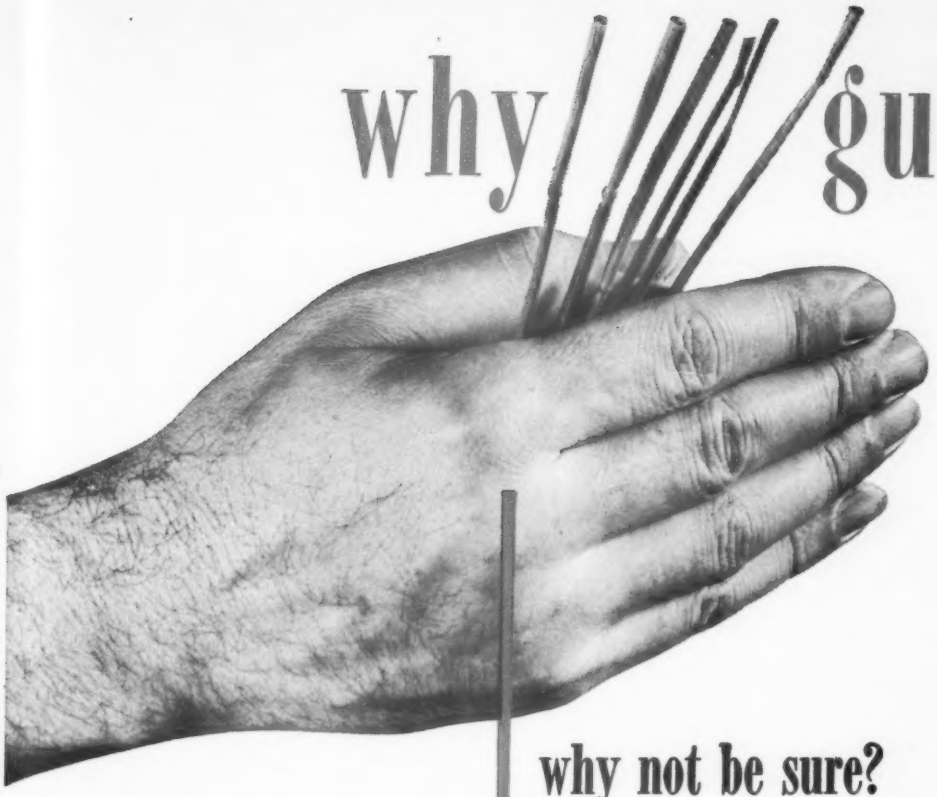

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ACINTOL* R

Specifications	
Acid number	160-170
Saponification number	168-178
Fatty acid content	0-3%
Softening point	172-190°F
Color	N-WW

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**Tall Oil Rosin as defined by The Naval Stores Act, Sec. 160.3 and 160.305

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ACINTOL D & DLR Distilled Tall Oil
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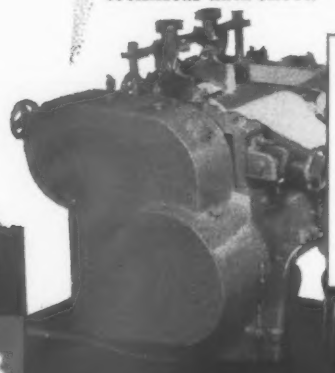

This is another example of the way Nuodex technical service and a Nuodex product can help you. So if you have a question about drying, mixing and milling, or mildew control, ask Nuodex *first*.

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Elizabeth F, New Jersey
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Included in the Continental line are lug cover pails, utility cans, flaring pails, and closed head drums in light and heavy gauge. Chances are one of them is just right for your product. We'll be glad to talk over your packaging problem, and suggest a container exactly suited to your needs.

CONTINENTAL CAN COMPANY

CONTINENTAL CAN BUILDING

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Eastern Division: 100 E. 42nd St., New York 17 • Central Division: 135 So. La Salle St., Chicago 3 • Pacific Division: Russ Building, San Francisco 4

Protective Coating Research By The Corps of Engineers

THE ENGINEER Research and Development Laboratories at Fort Belvoir, Virginia is charged with the development of equipment, materials and techniques necessary to military operations. In these days of highly mechanized warfare, it is frequently an Engineer's War. Therefore, the successful completion of the research studies being conducted by these Laboratories is of great interest to the military planners.

The Corps of Engineers has the responsibility of protecting troops, supplies and military installations by utilizing the art of camouflage. Many of the devices and techniques used in successfully fulfilling this mission depend primarily upon paint to achieve the necessary effect.

During World War II a water reducible paint was developed with the active cooperation of the industry. Millions of gallons of the paint was procured under the Army Specification T-1279, "Paint, Camouflage, Oleoresinous, Emulsifiable." It was designed to be reduced with water or gasoline, to withstand most any storage condition, and to be suitable for use on wood, metal or fabric. It was procured in nine basic camouflage colors.

In the early days of the war, color and color contrast was used to achieve concealment. However, with the advent of military aviation and the development of photographic methods of detection, camouflaged installations were found to be readily detected. An object painted green to blend with surrounding foilage photographed black when infra red film was used. The foilage, itself, would photograph as white since growing vegetation has a high degree of infra red reflectance.

As a result it was necessary to engineer infra red reflectance into the paint so that it would appear the same as grass or trees whether photographed with black and white film, color film or infra red film. The problem was successfully solved hen it was learned that most c acks and Prussian blue used in lhrome green were responsible for killing the infra red reflectance of the paints. Paints formulated around chromium oxide were the means of supplying the necessary shades of green paints without losing the properties of infra red reflectance.

Considerable development and research effort is still being expended in this field of camouflage. Current work at the Engineer Research and Development Laboratories will now be discussed.

Corrosion Inhibiting Primers

WITH the combat and operational engineers having the duties of speeding the attack of assault troops, the problems of bridging rivers receives intense study. In the field of protective coatings, this leads to the necessity of using durable protective coatings for the metal surfaces used in the various installations.

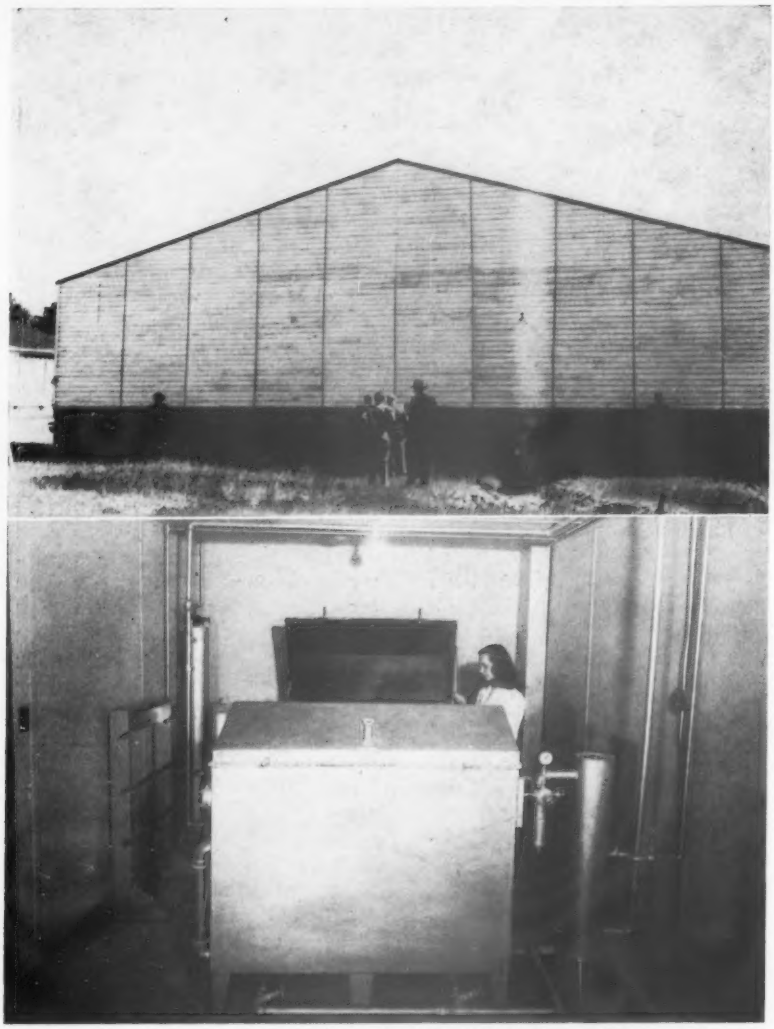
In many respects, pontoon bridges are the most difficult to protect. The paint must give a durable coating when the equipment is exposed to the atmosphere for extended periods as a result of storage. In addition, the abrasion resistance must be excellent to withstand repeated rough handling under the exigencies of modern war. Lastly, the coating must give good protection when the pontoon is immersed in water during operations.

The basic painting schedule for such purposes calls for two coats of a red iron oxide-zinc chromate pigmented phenolic varnish conforming to U. S. Army Specification 3-193 "Primer, Phenolic (Water Immersible)." One coat of a lusterless phenolic camouflage paint conforming to the U. S. Army Specification 3-194 "Enamel, Phenolic, Lusterless, Outside" is used as the finish coat.

For the protection of landing mats and gasoline drums a one coat finish was developed and is now covered by the Federal Specification TT-E-485 "Enamel: (for) Drums and other Metal Products, Rust-Inhibiting, Olive Drab." This enamel is a red lead-lead chromate pigmented alkyd. It serves as a corrosion inhibiting primer and finish coat all in one.

With the advances made in both pigment and vehicle developments, a cooperative study was initiated with the active participation of the protective coatings industry to determine what improvements would be desirable for such exposure conditions.

Under the leadership of Roy W. Hill of the Engineer Research and



Top: Inspecting paint condition of warehouse, Fort Mead, Md. Bottom: Salt spray laboratory.

Development Laboratories, an industrial committee was formed to advise and assist in the program. The committee is composed of E. C. Botti of DuPont Pigments, F. J. Burnett of General Electric Co., A. J. Eickhoff of National Lead Co., H. Ellerhorst of Inter-chemical Co., N. B. Garlock of Eagle-Picher Co., D. E. Leever of Reichhold Chemicals, Inc., R. W. Quarles of Mellon Institute, G. Shurr of Sherwin-Williams Co., J. D. Todd of Kentucky Color and Chemical Co., G. Wells of Bakelite Corp., and P. O. Blackmore of the Interchemical Co., representing the Federation of Paint and Varnish Production Clubs. Mr. C. J. Vander Valk of the Lead Industries Association is the secretary for the group.

Phases of Research

The research program is composed of several phases some of which constitute a new approach in the study of the corrosion inhibiting qualities of pigments. One phase of the program is that of evaluating comparative performance of the various government specifications that are used as corrosion inhibiting primers. Included in this portion are Federal Specification TT-P-86, "Red Lead Paint," of all four types; TT-E-485, "Enamel: (for) Drums and Other Metal Products, Rust-Inhibiting, Olive Drab; "MIL-E-6889, "Primer, Zinc Chromant;" U. S. Army Specification 3-193, "Primer, Phenolic (Water Immersible)," and others.

The second phase consists of a study of nine chromate pigments, such as zinc chromate (normal pigment grade), zinc chromate (of low soluble salts), normal lead chromate, basic lead chromate, zinc tetroxychromate, barium-potassium chromate (Pigment E), barium chromate, strontium chromate, and calcium chromate. Primers are being prepared with these pigments in an alkyd vehicle, a phenolic varnish and an oleoresinous varnish.

Critical Pigment Volume

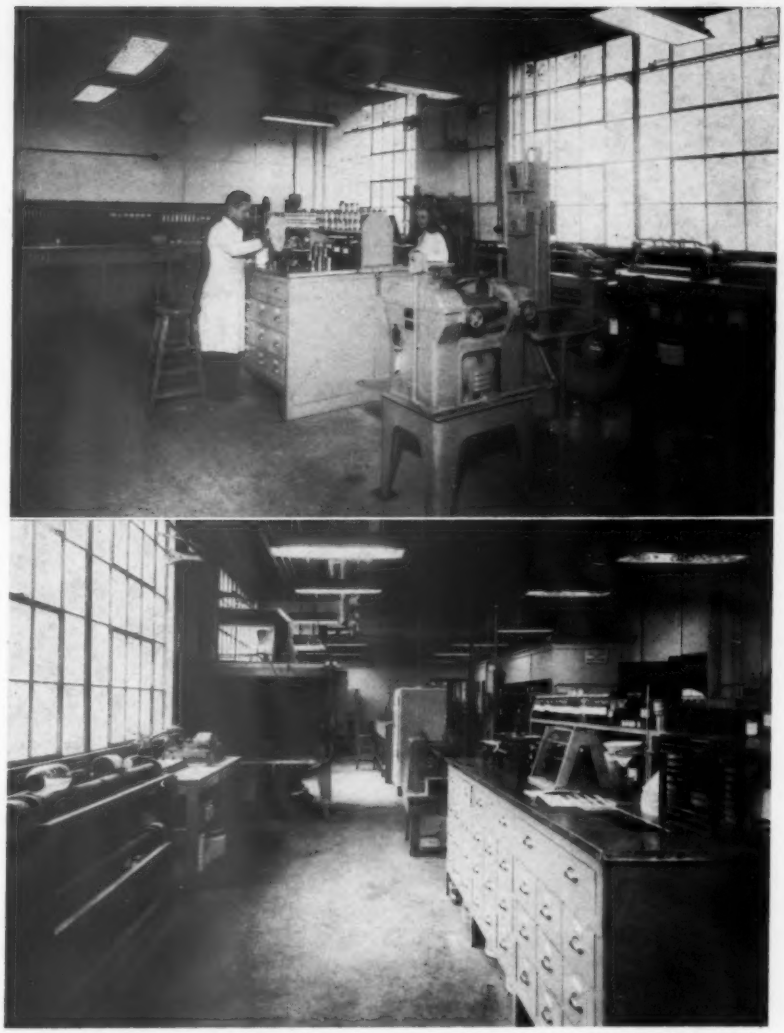
The formulation of each primer in each vehicle is to be adjusted so that the critical pigment volume (that point at which there is no excess vehicle over that needed for absorption on the pigment particles and for filling the interstices between pigment particles and agglomerates), and the total pigment volume concentration in the primers are equal. In addition, the volume of the chromate pigments in the nine primers for each vehicle will be the same. The volume of the red iron oxide in each formulation will also be equal.

To achieve all of these constants was a problem that is not usually customary. In normal investigation work, pigments are substituted for each other on a volume basis with the total pigment volume being held constant. However, various pigments have different values of oil absorption as well as dispersion characteristics so that when substituted on a volume basis there is a difference in the amount of free varnish available in the different paint films. The amount of free varnish influences permeability, blistering tendencies, gloss and protective qualities of the paint.

In addition, a primer achieves protection not only by the type and quantity of ingredients present in the film, but also by virtue of the chemical properties. For example, an aluminum paint depends a great deal upon the mechanical protection afforded by the metal layer formed in the leafed film. An ordinary pigmented primer can influence the rate of moisture transference by virtue of the quantity of pigment used. If too much pigment is present the film is porous because of insufficient

vehicle being present to form a continuous film. If too little pigment is used, the path of transmitted water is reduced and blistering may form at an accelerated rate.

In order to study the relative merits of the chemical inhibiting qualities of the nine chromate pigments, it is necessary to hold all of the mechanical factors as constant and as equivalent as possible. By holding the critical pigment volume constant, an attempt is made to obtain uniform protection by having equal amount of free binder present in all films. Variations in mechanical protection afforded by the pigment portion is reduced by holding the total pigment volume constant and equal for the different formulations. However, the results will have to be interpreted with the possibility that the different pigment compositions may have varying efficiencies of mechanical protection at the same pigment volume.



View of paint laboratory at Engineer Research and Development Laboratory, Fort Belvoir, Va.

Interpretation

In order to have a standard method for interpretating the relative chemical effect of the different chromate pigments, the chromate pigments were arbitrarily replaced on a volume basis. It is admitted that equal pigment volumes of the chromate pigment may have different efficiencies in mechanical protection. In addition the effects of amount of chromate in the pigment, the available chromate content or amount of solubility, as well as the relative cost of the different pigments will have to be given consideration in studying the result. Also of possible influence is a necessary minimum concentration of a particular pigment below which it has little merit but above which it may be equal or superior to the other pigment.

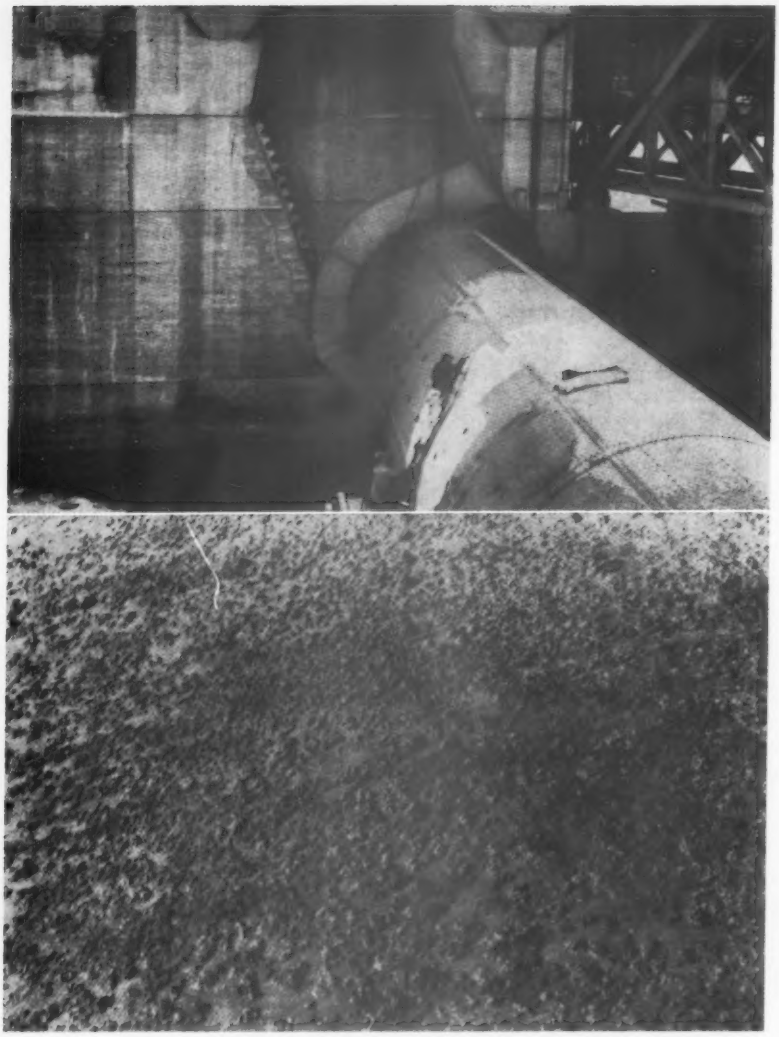
Extenders

All of these conflicting mechanical requirements are being controlled, in so far as is possible, by a judicious selection of extenders. By extender selection as well as quantity it is possible to achieve a series of paints all having the same amount of free binder, the same total pigment volume and equal volumes of chromate pigments as well as red iron oxide. The only ingredients that change in quantity are those of the two extenders used in controlling the above requirements. As the starting formula, the pigment composition was arbitrarily selected to consist of 40% zinc chromate, 15% red iron oxide, and 45% as the extender composition (by weight).

Variables

Another phase of the investigation is an attempt to examine the other possible variables in rating efficiency of chemical inhibition. Three series of paints are being made in an alkyd vehicle with the zinc chromate content of the pigment portion being 15, 35 and 65% by weight. The other chromate pigments are substituted for the zinc chromate on an equal weight basis. The balance of the pigment composition consists of 15% magnesium silicate with the remainder being red iron oxide. All of these paints are being made in the alkyd vehicle only.

It is admitted that the various paints will have varying pigment volumes as well as chromate contents in the film since the pigment to vehicle ratio is being controlled by arbitrarily keeping the pigment content 5% below the critical pigment volume concentration. However, the series will be valuable in interpreting the results of the main program since the relative merits of the different chromate pigments are influenced by the volume, oil absorption, weight, chromate content, and available



Top: View of roller gate. Bottom: Microphotograph showing corrosion on roller gate.

chromate content as well as other considerations.

TT-E-485

Still another phase is being undertaken by the Baltimore Production Club in that Specification TT-E-485 will be studied with the various chromate pigments substituted for the lead chromate at present called for. This more practical approach will serve as a check on the more academic program as well as illustrate the comparative merits of the variation in chromate type in its own right.

Evaluation

These paints will be spray applied by expert spray painters (courtesy of the DeVilbiss Co.) to insure uniformity of application. Magnesium panels (courtesy of the Dow Chemical Co.) aluminum panels and steel panels will constitute the various test surfaces. The panels will be exposed to atmospheric exposure at Sayville, L. I., (courtesy of the National Lead Co.), underwater exposure in the fresh water flume, (courtesy of the Cincinnati, Ohio Water Department), and a salt spray exposure under controlled conditions (courtesy of the Parker Rustproof Co.)

At the conclusion of the evaluation program, those pigments that demonstrate superiority of performance will be further studied in the various vehicles where they showed superiority as well as under the particular exposure conditions where their merit was demonstrated. This further work will be undertaken with consideration being given to the more practical and customary methods used in primer study and evaluation with the hopes that performance of primers for military uses will take some forward steps. It is the intention to make the results of this work available to the industry so that any promising leads developed may also be studied for use in civilian practice.

Underwater Paints

THE study on corrosion inhibiting primers also fits into the interests of the Corps of Engineers in the protection of locks and dams erected in navigable rivers. The functions of erection, maintenance and control of the locks and dams was assigned to the Corps of Engineers of the U. S. Army and is handled by the Civil Works Division.

The Civil Works Division is composed of twelve Engineer Districts which embrace the entire United States. These districts usually handle the paint problems of a local nature themselves, by issuing specifications and making purchases. A central paint testing laboratory for their procurement testing has been established at Rock Island, Ill.

Field Testing

A great deal of the field testing of protective coatings for underwater metal structures is carried out with the active participation of the protective coatings industry. Those systems which appear promising from a laboratory study are applied to sections of a tainter or roller gate which is then put into service. Periodically through the years, the interested parties are assembled for examination and rating of the various systems.

Rating

The rating system used is based on ten points being awarded to a perfect coating. Detailed ratings are made by breaking this ten point rating into several component factors. Six points are given if there is no rusting, and this rating is decreased as the amount of rusting increases. If there is no blistering of the paint system, a rating of two points is awarded. This value is also decreased as the amount of blistering increases. One point or

fraction thereof is awarded based on the amount of top coat remaining. The last point or fraction depends upon the degree of protection afforded the metal by the primer coat. On this system of rating, a gate is scheduled for repainting when the protective value of the paint system falls below a value of six.

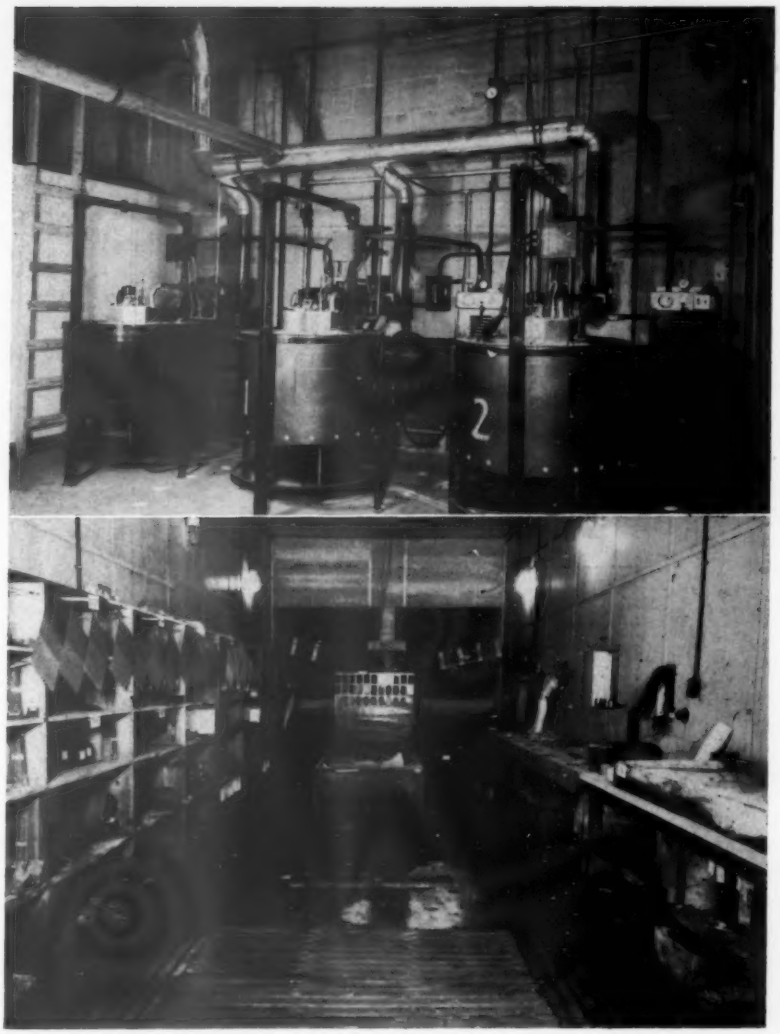
Using Sand

One of the more interesting side lights from these investigations has been the demonstrated value to incorporating sand into the paint system. While the second primer coat is still wet, clean silica sand is spray applied. The addition of the two top coats locks this sand into the paint film. Extensive study as to which coat of paint is best for the application of the sand has shown it to be the second primer coat. If the sand is applied to the first primer coat, rusting is frequently accelerated. With the sand applied in either of the last two coats of a four coat system, there is insufficient "locking in" to the detriment of the paint system.

The sand increases the durability of the paint system in two ways. The first and most important is that the film thickness of the paint system is greatly increased. In order to obtain the same overall film thickness with paint, four to six additional coats of paint would be necessary. Not only would these additional coats require greater application and drying time, but they would also increase the overall cost of material since they would have to make up for the volume of the sand used.

The second manner in which the the sand aids the durability of the paint system is by increasing the abrasion resistance. The coarse textured surfaces appear to withstand the bumping and scrapping of logs and debris that float in the stream as well as the more steady erosion action of the silt and sand laden water.

By consistent study and the active interest of the industry the durability of the paint for these applications has risen from the original six months to a service life of better than six years before repainting is necessary. It is hoped that even this painting schedule will be improved upon with further study.



Top: View of accelerated weathering laboratory. Bottom: Tropical testing chamber; note panels.

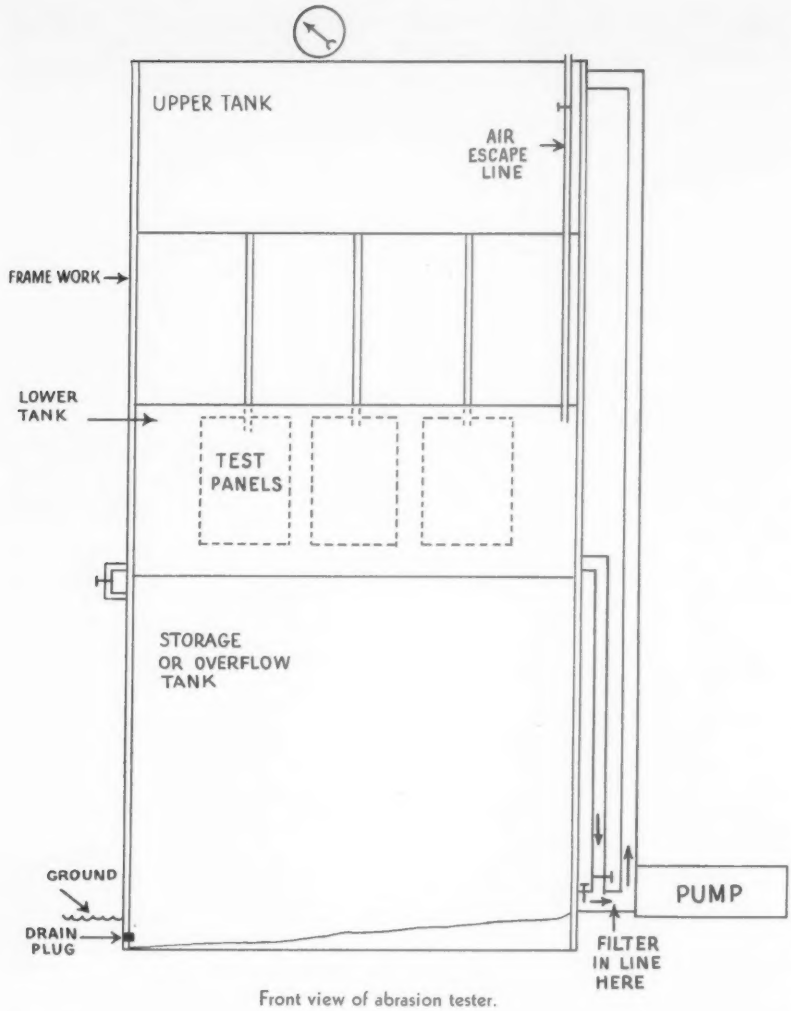
Fire Retardant Paints

WITH the Corps of Engineers being responsible for the construction and maintenance of Army camps, hospitals, warehouses and the like, it is necessary to insure their safety as well as the safety of the occupants in these days of potential air raids. One of the major steps forward is that of rendering the normal wooden structures more fire retardant than they normally are. To reach this goal, a program on the study of fire retardant paints is in the final stages.

The purpose of this study was to develop suitable fire retardant specifications for the procurement of adequate paint or paint systems for use on wood and wall board surfaces. Three types of finishes were considered for this purpose as follows:

a. Type 1 would be suitable for exterior surfaces.
b. Type 2 would be suitable for interior use and would serve as a finish coat as well as the fire retardant coat.
c. Type 3 would also be suitable for use on interior and possibly exterior surfaces but would require an overcoater to be used as the finish coat.

Commercial products were solicited from the industry and subjected to an extensive study. Painted panels were exposed on both primed and unprimed poplar wood and placed on outdoor exposure in an Arctic climate at Fort



Front view of abrasion tester.

Churchill, Canada; a desert climate at Yuma, Arizona; a tropical climate at the Panama Canal, Panama, and a temperate climate at Fort Belvoir, Virginia.

Tests

At the same time, laboratory tests were conducted on the fire retardant paints on both primed and unprimed panels. The tests included accelerated weathering, (without the water spray because of the warping tendencies of the panels); an oven exposure to duplicate the heating effects of the weathering machine without the ultraviolet light (to determine whether the results obtained were due to the heat of operation, the ultraviolet light of the exposure or a combination of heat and light); a tropical chamber exposure to simulate that of tropical field exposure; and an accelerated laboratory incubation test to determine mildew resistance qualities of the paints. In addition a humidity exposure was included.

Before and after these exposure tests, the fire retardancy values of the paints were determined by the Cabinet Test Method as developed by the *New York Production Club* as modified by Fort Belvoir. The modifications consisted of using five milliliters of alcohol in a brass cup held one inch from the panel. In addition, the panels were oven dried 40 hours at 120 F before running the burning test.

In addition an examination was made to determine the relation of weight loss to char length, char width, char depth and char volume. It was also necessary to determine the rate of coverage and the number of coats needed, not only for specifying the manner of running the test but also to recommend a standard minimum goal for actual application. This was done by studying the results on wood and wallboard panels with the paints applied at 1, 2, 3, 4, and 5 coats to determine the interrelation of these various factors.

All of the paints were rated for film durability after six and twelve months of exposure at each field test site. It was found that a paint was not always equally good for all climates but when bad for one, it was bad for all. The fire retardancy properties of the paints also followed this conclusion.

The accelerated weathering test did not serve as a reliable screening test for predicting performance at the field exposure sites. This observation was not too surprising in view of the fact that the results at no two exposure sites were in very close agreement. However, it had been expected that some correlation might have existed between the modified accelerated weathering exposure and that of the desert climate.

The results from the heat test did not throw any light on the lack of correlation between the weathering machines and outdoor exposure. This was partly attributed to the fact that some of the paints were affected more by heat than by ultraviolet light whereas others were altered more by the light than by the heat.

A high degree of correlation was found to exist between the mildew growth of a six months Panama exposure, a two month tropical chamber exposure, and a controlled laboratory incubation test of two weeks. In other words, the two week incubation test could be used to successfully predict whether a paint would withstand attack by fungus and mildew after a two month simulated tropical exposure or an actual six month tropical exposure.

Effect of Film Thickness

With most of the fire retardant paints it was found that the greater the film thickness of the fire retardant paint, the greater was the protection afforded the base surface and the less was the amount of combustion. This fact was particularly noticeable from the char volume factors since the amount of

(*Turn to page 45*)

Chemical Engineering In Alkyd Resin Manufacture

By STANLEY YOKELL
Industrial Process Engineers
Newark, N.J.

SOME of the problems which the Chemical Engineer faces in the design and operation of Alkyd plants are: selection, operation and control of the heating system; providing a means for rapid heat removal; choosing proper materials of construction; design and operation of agitation; measurement and control of the reaction; fume disposal ; design and operation of pilot equipment.

In selecting the heating system, factors of first cost, thermal efficiency, fuel costs, maintainance costs, degree of control obtainable, safety and upheat times must be considered.

Heating Systems

THE system carrying the highest first cost is Dowtherm. Its advantages are high degree of safety, close control, adaptability to automatic control with proportioning, automatic reset and rate control possible, and automatic programming feasable, the use of cold dowtherm liquid for cooling the batch, low upheat time and flexibility. Thermal efficiencies at the boiler are in the vicinity of 60%, with line and radiation losses for compact installations kept below 5%. Gas or oil can be used as the fuel. Extreme care must be taken in piping up for Dowtherm, because of its high fluidity. Space requirements for Dowtherm are greater than for any other system.

The electric furnace is next in line of first costs, and is undoubtedly the most expensive to operate. It can be made to approach Dowtherm in degree of safety. Where sufficiently elaborate control equipment is installed, control of batch temperatures within 5°F is possible, compared with 1°F obtainable with Dowtherm. The heating areas are divided into zones, which makes possible the cooking of various size batches and initial processing of reactants without charring at the operating level. There is no way of removing heat from the setting without loss of safety features, and batch cooling must be done either by internal coils, or by pumping the reactants through an external cooler. The latter method can be used only where the particular process lends itself to the operation, and can be employed with any of the heating methods. It can be arranged for automatic function where pump out is employed, by interconnecting the pump and recording temperature controller. In examining the electric system, demand current costs, and use costs must be tied in with the general demand and use costs, and periods of maximum load that exist in other plant components.

The gas-fired radiant furnace setting approaches the electric furnace in first cost, and the Dowtherm system in degree of control attainable. Modulating control is possible, and the system lends itself to automatic programming. During periods of cooling, and for preventing temperature override, the air blower is used. A distinct advantage of gas as a fuel in direct fired settings is that from the instant of ignition complete combustion takes place in the cup burner, preventing partially burnt materials from sooting up breachings and refractories.

Another advantage is that unburnt fuel does not accumulate on the furnace surfaces. On the basis of cost of fuel per Btu, gas is more expensive than oil heating. Degree of control, relative safety, cleanliness of operation, and minimum maintainance substantially whittle down the difference. With gas heating, either of the previously described cooling methods can be used. The system also lends itself to a very efficient type of cooling, when the furnace is designed for

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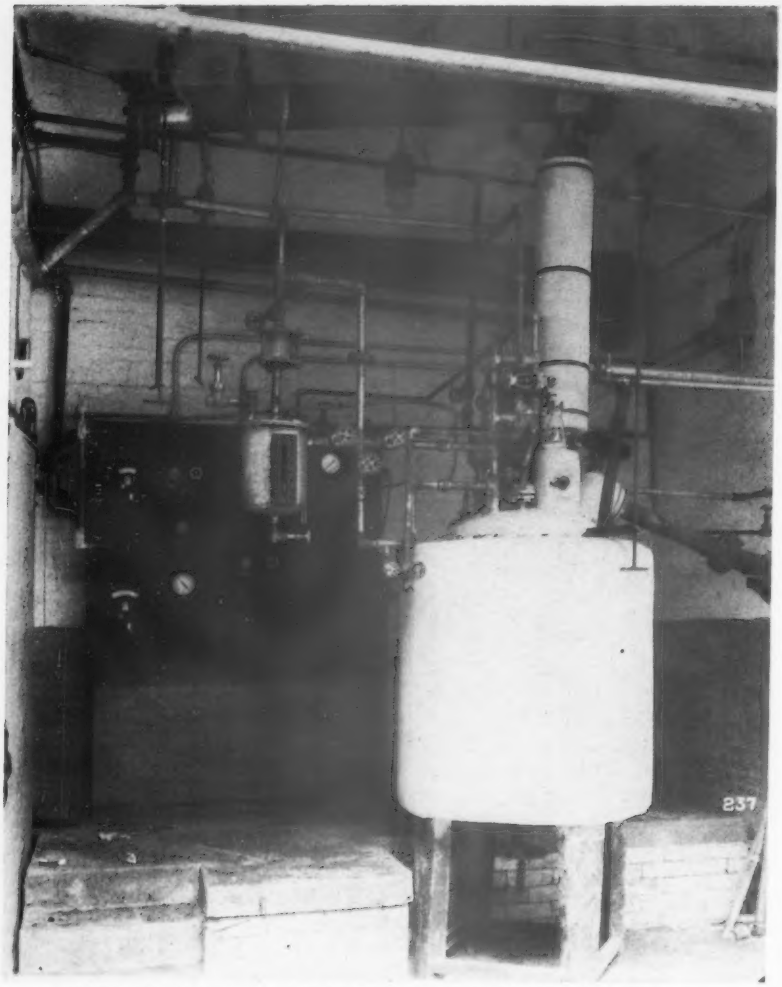
This talk was presented before the Vehicle Group of the New York Paint, Varnish and Lacquer Association on May 14, 1952. Reprints are available from Industrial Process Engineers, 8 Lister Ave., Newark 5, N.J.



Electrically-heated pilot alkyd resin plant arranged for flexible operation.

minimum kettle immersion in the setting. This method is to surround the kettle wall above the firing ring with a suitably designed jacket, and spray cool the autoclave wall. Cooling rates of more than two degrees F per minute, have been obtained in Alkyd kettles of 2,000 gallons total capacity, with systems designed by Industrial Process Engineers. The water supply can be automatically controlled.

Cost Considerations

CHEAPEST in first cost is the oil fired setting. Operating costs can be controlled to the point where it is also the most economical system to run on the basis of cost per Btu. Split control of the on-off type is customary. The same types of cooling can be used with oil firing as with gas firing.

Table I lists approximate thermal efficiencies.

Selection

INPUT heat densities must be considered with all methods of heating because of the harmful effects of high metal temperatures. In the discussion of agitation, the manner of variation of metal wall temperatures with kettle size, input heat densities and agitation variables will be explained. The heating system selected will have an effect on the materials of construction.

The selection of materials of construction must be made with an eye to the factors of first cost, strength of materials at the operating temperatures, and corrosion or discoloration rates.

For Dowtherm autoclaves, mechanical design considerations, predictable low metal temperatures and cost factors have led to the consistent use of Austenitic stainless clad steels in autoclaves of 1,000 gallon capacities and above, and solid stainless steel for smaller installations. Solid stainless is in general use for all of the other methods, although other materials have been used.

None of the 300 series of stainless steels is materially affected by corrosion, in Alkyd kettle, and type 304 which is an 18-8 stainless steel with .08% maximum carbon is generally acceptable. In some operations there is a tendency toward product discoloration from fatty acids acting on kettle and auxiliary surfaces.

Where extremely clear products are desired, this effect can be overcome by the addition of molybdenum to the steel. Stainless bearing this element is known as type 316.

An understanding of the effects of prolonged heating in various temperature ranges is required for intelligent selection of materials. The key to this understanding is that Austenitic stainless steel is in a state of arrested equilibrium, which is brought about by the heat treatment employed in the manufacture of the steel. In the Austenitic stainless steels the balance of phases is such that no magnetism exists, and carbon is dissolved within the metal grains. At temperatures above 800°F Carbon tends to migrate from its solid solution within the grains to the grain boundaries, where it com-

Table I. Approximate thermal efficiencies.

METHOD	THERMAL EFFICIENCY	AVERAGE
Dowtherm	55%-65%	58%
Electricity	75%-90%	83%
Gas	50%-65%	57%
Oil	35%-50%	43%

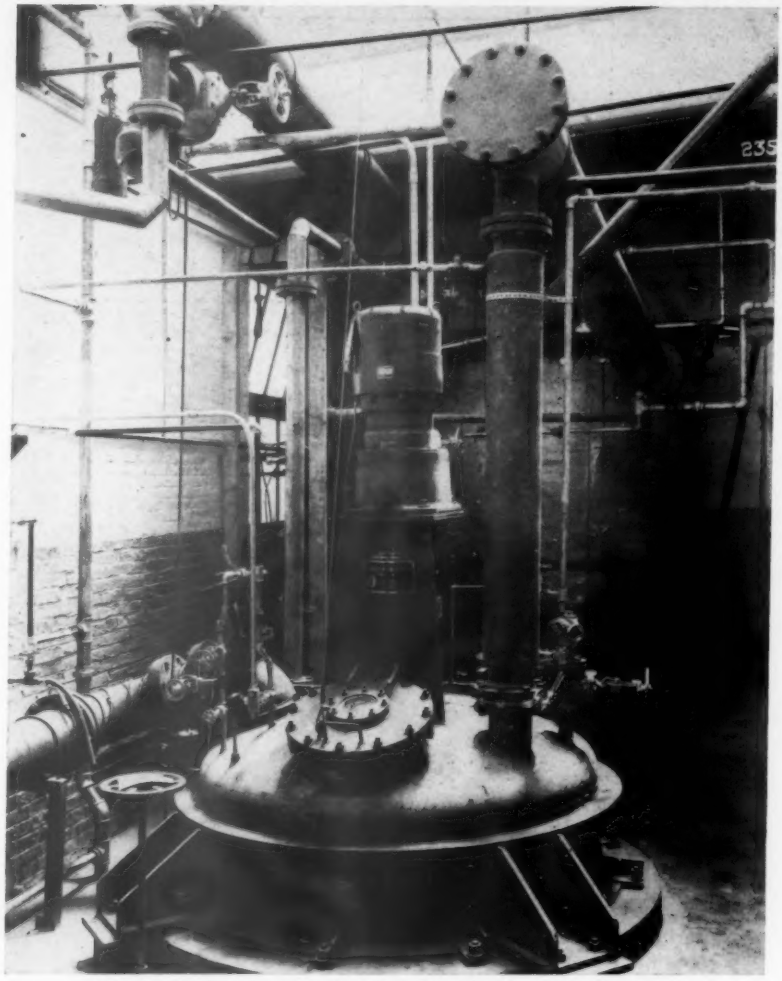
bines with Chromium, effectively putting the Chromium in the region out of the battle against corrosion. This phenomenon, called sensitization, permits further corrosion, which manifests itself as pitting, since the corrosion occurs at the grain boundaries permitting the grains to fall out. Sensitization takes place slowly at 800°F, increases rapidly to 1400°F, with the maximum rate between 1000°F and 1400°F. At higher temperatures, in the vicinity of 1800°F, the reaction reverses itself and the carbon is redissolved. The addition of Molybdenum materially slows sensitization, and a straight 316 is therefore more resistant to Carbide precipitation than a straight 304. Molybdenum, however, promotes formation of the ferritic phase. If the carbon content of the steel is reduced to .03% max., there is insufficient carbon to permit precipitated carbides to surround the grains, and corrosion is inhibited. Alternatively, Columbium or Titanium can be added to the melt in sufficient quantity to lock up the carbon by the formation of stable compounds. Another beneficial effect of the addition of stabilizers is their contribution to the hot strength of the metal. A disadvantage is that their action is not uniform since difficulty is experienced in dissolving the stabilizers. They also contribute toward the formation of the ferritic type steel. Where the right combination of furnace design and agitation is used, it is possible to maintain skin temperatures near or below 800°F, and use SS type 304 with confidence and safety.

For the purpose of cost comparisons, it should be borne in mind that material costs account for 55 to 70% of the purchase price of equipment. Table II lists the Base costs of the different alloys as of the present date.

Table II. Base cost of different alloys.

ALLOY	BASE PRICE*
304	$35.25
304 ELC	40.25
321	40.75
347	45.25
316	52.00
316 ELC	57.00
318	60.75

*Dollars per hundred weight



Alkyd resin plant showing external cooler and solvent process piping.

In using these figures for comparison, it should be remembered that material costs are figured on the basis of base price plus extras for size, quantity, circling etc.

Agitation

The consideration of agitation, logically follows consideration of heating systems and materials of construction, because of the correlation between heat transfer inside the kettle, and agitation. Agitation in Alkyd manufacture serves dual functions; that of uniformly distributing reactants and thus assisting reaction rates to approach theoretical, and ensuring that forced convection exists within the kettle, for heat transfer purposes.

In a fully baffled kettle, the criterion of turbulent agitation is the Reynolds number, which is where N is $\frac{NL^2P}{\mu}$ speed of rotation, L, impeller diameter, P, density of the fluid mass, and μ is viscosity. Where the ratios of kettle diameter to height, impeller diameter to kettle diameter and batch height above impeller to kettle height are maintained constant, it is possible to duplicate the fluid regime in different sized kettles. An interesting point, for people who have tried unsuccessfully to measure batch viscosity by measuring input current to the driving motor, is the fact that when the Reynolds Number exceeds 10,000 a change in viscosity has no effect on the power consumed by turbine impellers operating under baffled flow conditions. Since the range of Reynolds

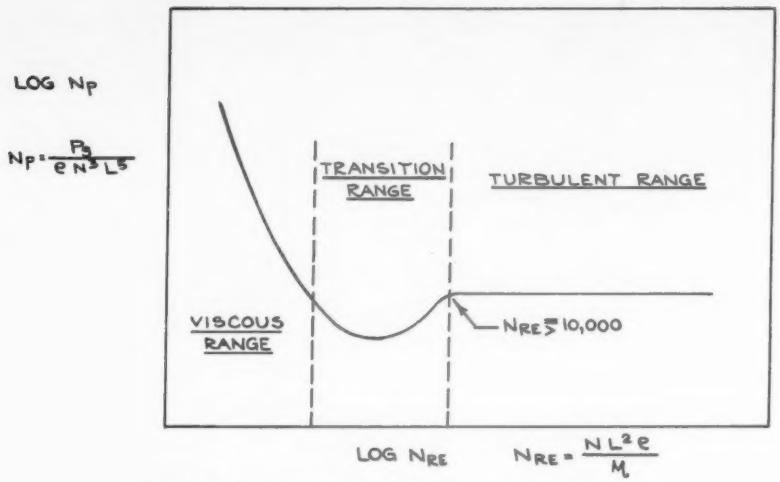


Figure 1. Power characteristics of baffled turbine agitators.

numbers that exist in most Alkyd installations is in the order of magnitude of 100,000 to 1,000,000, ammeters do not exhibit a variation. (see figure 1)

From the standpoint of mixing, the best means of selecting the agitator is pilot data or past experience, records of which are usually kept by equipment manufacturers, and which can be correlated as outlined, but from the point of view of heat transfer, other factors must be correlated with the Reynolds group. In the system under discussion heat transfer rates are controlled by the fluid side film, which is always present, and which undergoes viscous flow, no matter how turbulent the agitation. The variation of the film coefficient of heat transfer with the properties of the materials being processed and the dimensions and speeds of rotation is of the form:

$$h = (N_{Re}^{x})(N_{Pr}^{y})(k)\left(\frac{\mu_c}{\mu}\right)^{0.14}$$

Measurements of x and y have given values of 0.62 to 0.68 for x and 0.333 for y. N_{pr}, the Prandtl number consists of Specific heat times viscosity divided by thermal conductivity of the batch. The ratio of μ_c to μ is employed to correct for viscosity variation with difference in temperature at the kettle skin and in the mass. The important thing to note is that heat transfer coefficients increase with increasing Reynolds numbers and decrease with kettle diameter. By making certain assumptions and using data available in the literature on agitation, it is possible for the engineer to predict with reasonable confidence the temperature range at the outer shell surface for any input heat density. This information is required before selection of the material of construction and thickness can be made. Discussion of mechanical features of agitation will be limited to the statement that extreme care should be given to the design of stuffing boxes and the selection of shafting, especially where shaft support is to be entirely outside the vessel. In the latter case consideration must be given to the method of adding ingredients to the batch before assumptions of design loads can be made.

Maintenance and Control

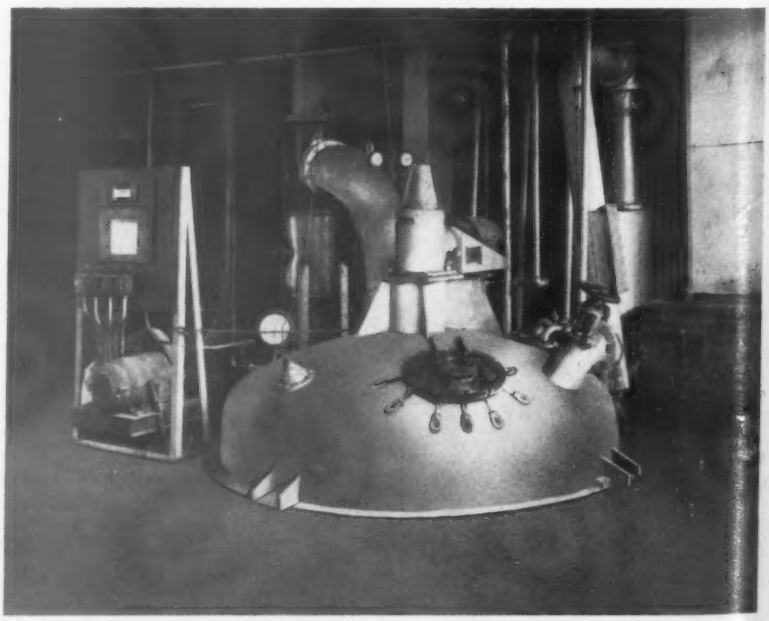
BECAUSE of the importance of function of agitation, thought must be given to maintainance. Overload protection is mandatory. Prevention of sudden shocks to the impeller is not always possible, but should be aimed at. Impeller construction of hot rolled material is more desirable than bolted cast parts. It is wise to set up a progressive maintainance and inspection program with special attention given stuffing boxes, drives, and shafting.

Jumping to measurement and control of the reaction, the problems faced here are primarily problems of sampling and measurement of viscosity. What appears to be a satisfactory device for continuously measuring viscosity during reaction, and controlling the reaction by these measurements, has recently come on the market. This is know as the ultra viscoson, but its appearance is so recent that we have as yet been unable to gather sufficient service reports to describe results.

Fume Control

NOWADAYS the problem of fume disposal is one of increasing importance due to a

Direct fired 2500 alkyd resin plant for solvent processing shows vapor fume scrubber.



tremendous upsurge of public interest and municipal control of air pollution. Three common methods are in use for fume disposal; obnoxious vapor condensing, with combination of sludge box and washing; incineration; and absorption. A general survey of methods is to be found in Publication circular No. 703 of the National Paint, Varnish and Lacquer Association. The obnoxious vapor condenser is more or less efficient, cheap to operate and install, and can be manifolded for use on several kettles. The system consists of a venturi eductor which pulls a vacuum on the kettle, using water as the educting fluid. When combined with inert gas sparging it effectively removes malodorous soluble and condensible materials from the fume stream, but does not affect insoluble low boiling components. The system must be set up and operated so that the possibility of water from the obnoxious vapor condenser backing up into the kettle is minimized. Common practice is to install a stand pipe open to the atmosphere below the level of water inlet to the condenser. Thus, should the discharge from the sludge box become plugged, water can overflow at the stand pipe head, instead of filling the lines and running into the kettle.

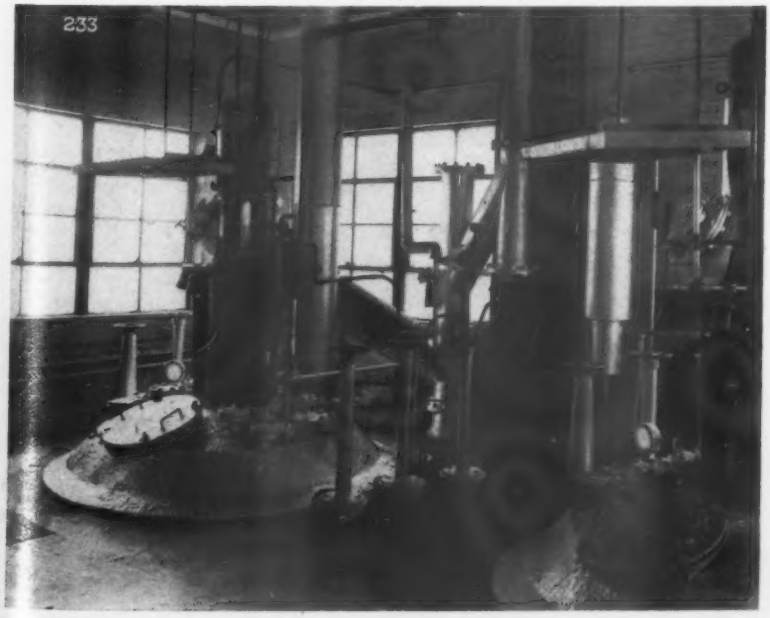
Incineration has been studied by the Brooklyn Union Gas Company; their findings were published in Industrial Gas, April 1948 in an article written by Joseph Jares. Fume ignition temperatures and values of maximum fuming rates given in that article are quoted in Table III. Ignition temperatures rise with increasing amounts of CO- and water vapor.

MATERIAL	FUME IGNITION TEMPERATURE °F	MAXIMUM FUMING RATE PER CENT
Raw Linseed Oil	1150	3.6
Refined Linseed Oil	1130	2.7
Linseed and Fish Oils 50-50	1140	3.2
Z-3 Linseed and Z-3 Castor Oils 50-50	1120	2.6
Alkyd-talloil-Penta	1280	9.5
Varnish formulations	980 to 1160	2 to 6

Table III. Data on fume temperature and fuming rates.

The "bugaboo" of incineration systems is the potential hazard of a flashback to the kettle. Where solvent process cooks are made, this hazard is even more frightening. Without going into detail, it is worth pointing out that safe, successful incineration systems are in use in this area, and if sufficient design care is given to the system it may be used with confidence and safety. Incineration is the most complete method of fume disposal since all of the fuming agents may be burned to non-odorous products.

Upper floor view of twin Dowtherm heated alkyd plant. Cooling, remote operation features unit.



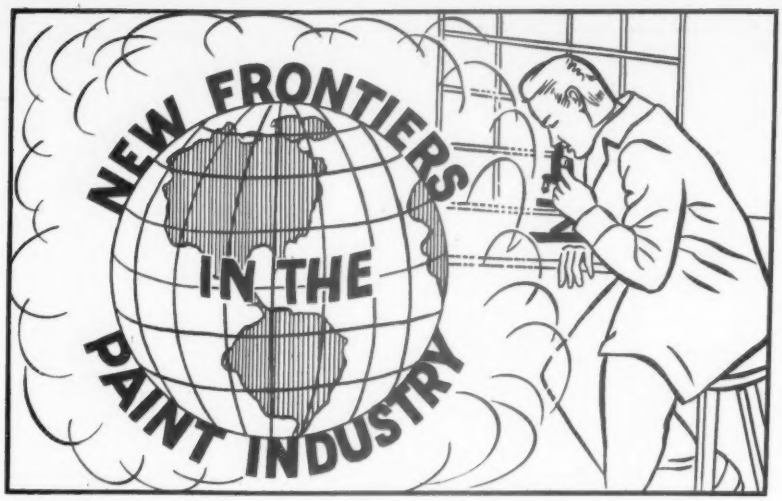
Absorption was discussed in the March 1952 issue of *Paint and Varnish Production.* Implied in the article is that a solution has been found to the problem of sludge accumulation and blinding of the absorption system.

Pilot Equipment

MOST interesting to the Chemical Engineer is the design and operation of pilot equipment. Its importance can not be overemphasized, since a properly set up pilot plant can be used to investigate new products, iron "bugs" out of production, investigate more economical production methods, obtain data for process control, plant scale production of small quantities of specialty materials and so on.

The cost of such a unit may well approximate the cost of a production scale set up, since it must have features which are unnecessary and may be undesirable in the larger units. Pilot size units range in capacity from 25 to 500 gallons total, permitting studies to be made on batch sizes from 5 to 250 gallons. Desirable features are highest grade material of construction, complete recording and control instrumentation with wide variation of instrument settings, possible variable speed agitation, provision of all of the various methods of cooling previously described, with internal coils removable, arrangement for the installation of several different sizes of turbine impeller, piping for convertibility from one type process to any of the others, design for pressure and vacuum, and visual arrangement of instruments. The pilot plant should be installed to permit its rearrangement with a

(*Turn to page 51*)



Extractive Crystallization

By

PHILIP HEIBERGER

THE ADVANTAGES of separating drying and semi-drying oils into two or more well-defined fractions are well known. The more unsaturated fraction possesses improved drying properties whereas the more saturated fraction is valuable for manufacturing soaps, edible fats, lubricants and other non-paint products. Many commercial installations are carrying out such separations by means of fractional crystallization or by suitable solvent extractions. In the Emersol process, free fatty acids are fractionally crystallized from their solution at low temperatures. The Pittsburgh Plate Glass Company's process involves selective extraction with furfural whereas the Solexol process utilizes liquid propane as an extractant. For laboratory scale separations, chromatographic methods are extremely popular.

A new separation process which shows great promise of providing the chemical industry with an entirely new tool is currently undergoing development. The overall process is termed Extractive Crystallization. Specifically, extractive crystallization with urea enables one to separate fatty acids solely on the basis of their degree of unsaturation. Kenneth A. Kobe and William G. Domask of the University of Texas have recently reviewed this field in the magazine *Petroleum Refiner*, (March, April and May, 1952 issues). Their article entitled "Extractive crystallization — A New Separation Process" outlines in great detail both the theoretical and the practical applications of the method. Because of the value to many phases of the paint and related industries, the method of extractive crystallization will be discussed from the point of view of the paint industry.

Method

Urea forms crystalline addition complexes or "adducts" with long straight-chain organic compounds, whereas thiourea forms crystalline adducts with branched-chain and certain ring-type compounds. A high degree of specificity is exhibited by these two chemicals in the formation of complexes, and the reactions involved are generally rapid and simple to conduct. Thus, if a mixture containing a long normal paraffin, such as n-hexadecane, and a highly branched compound, such as 2,2,4-trimethylpentane, is mixed with a saturated methanol or aqueous solution of urea, a crystalline complex forms almost immediately between the urea and the normal paraffin, leaving the branched compound in the liquid phase. The adducts can be handled like ordinary crystalline precipitates and as such are easily filtered. The precipitate is readily dissociated by heating or upon dissolution in water. Since the two types of adducts are complementary and as a rule distinctly selective in their action, there is provided a means for a separation process.

The first material concerning this discovery was in a German patent application filed in 1940 which was kept secret by Germany. After the war, the information was made available to this country. The method was soon extended to mixtures of polar compounds such as fatty acids, esters, ketones, unsaturated hydrocarbons and many others. In an article published in *Industrial and Engineering Chemistry*, *42*, 2538, (1950), Newey and a group of Shell Development Company workers have adapted the method to improving drying oils and resins. They found that extractive crystallization with urea can be used to separate a more saturated fraction from a more unsaturated fraction. Apparently the double bonds cause the chains to deviate from the linear form sufficiently to reduce the tendency for adduct-formation.

Mechanism

The mechanism of adduct formation and the structure of the adduct, although well established, is quite complex. Apparently the urea molecules form interpenetrating spirals around the long chain hydrocarbon molecules. The stability of the structure so formed is accounted for by assuming an interplay of hydrogen bonding and van der Waal forces between the long chain molecules and the urea molecules. The absence of primary valence bonding is confirmed by the fact that the adducts are readily destroyed by mere dissolution in water. Because unsaturated fatty acids are no longer linear, a mixture of saturated and unsaturated fatty acids can be separated by shaking with concentrated aqueous urea solutions. The more saturated portion of the fatty acids will form crystalline adducts, which can be filtered from the more unsaturated fraction.

It was further observed that the fatty acids combined in the urea adducts did not develop odors or become rancid. In fact, fatty acids can be protected from oxidation for extended periods of time when combined as urea adducts. For example, linoleic acid recovered from its adduct after standing one month in exposure to air was found to be unaltered. Of the many useful separations cited in the Kobe and Domask's review, only the application to oil and fatty acid separations will be discussed in detail.

Although many unsuccessful attempts have been made to obtain pure fatty acids from a mixture by means of crystallization, the mutual solubility effect of one acid on the other always cause a shift in the equilibrium to prevent the isolation of a pure fatty acid by ordinary crystallization. However, the urea crystallization process does provide a good separation. In the case of fats and oils, even if a mixture contains two or more adduct formers, separation is frequently possible because of differences in reaction rates. For example, although stearic and oleic acids form complexes with urea, the saturated stearic acid reacts much more rapidly than does the double-bond containing oleic acid. Similarly, differences exist for drying oils which depend

upon the degree of unsaturation.

Time Factor

As an example of a reaction rate difference, a starting mixture of a 56/44 weight ratio of stearic and oleic acid in benzene was treated with a solution of urea in water. After five minutes, 40% of the stearic acid had reacted to form a complex having a stearic acid purity of 97.5%. This represents a separation ratio of 37 to 1. However, after two hours, the pseudo-equilibrium purity of the adduct had dropped to 88 weight percent stearic acid, giving a separation of only 4.5 to 1. At this point, 95% of the total stearic acid had reacted. It was found that the optimum purity-yield balance for both the stearic and oleic acid fractions was obtained after a period of 20 minutes.

In up-grading the iodine values of oils, it will be found that a maximum purity rate will also be reached. The saturated fraction complexes rapidly, thereby increasing the iodine number of the unreacted unsaturated fraction which has a lower reaction rate and tends to remain in the liquid phase. However, after the optimum time, the iodine number of the unreacted phase will begin to fall off as more and more of the unsaturated compounds reacts to form an adduct. The use of the method is simplified by virtue of the fact that the temperature at which the reaction is conducted does not appear to be critical.

Examples

A detailed example is published by Newey et al which is informative and illustrative—

250 grams of linseed oil fatty acids was dissolved in 250 grams of methyl isobutyl ketone and stirred into 2 liters of a saturated aqueous urea solution at 23° C. (1200 grams of urea). In the course of 5 minutes, a copious, white crystalline precipitate was formed. Stirring was continued for 0.5 hours and the adduct was then filtered off and carefully washed with 500 ml. methyl isobutyl ketone. The crystalline adduct was decomposed by stirring with one liter of water at 60 to 80° C., which dissolved the urea and left the extract and residual methyl isobutyl ketone in an upper layer. This was washed with water, separated and the methyl isobutyl ketone was removed under vacuum. The extract was a solid melting at 46° C. The methyl isobutyl ketone layer of the combined filtrate and washings, which contained the portion of the acid not forming an adduct, was separated and washed with water. The solvent was removed under vacuum. The results are given in Table I.

Resume

In this experiment the urea removed 16% of an extract compound consisting mainly of stearic and oleic acids (iodine values = 0 and 90, respectively). Simultaneously it concentrated the linoleic and linolenic acids in the raffinate (iodine values = 181 and 273, respectively). The precipitate formed was crystalline and easily filtered. The adduct contained approximately 12 moles of urea to each mole of fatty acid, which is about 72% urea and 28% fatty acid by weight. The use of so much urea is not a very great disadvantage since it can be readily recovered and reused.

	Original Linseed Acids	Extract	Raffinate	Loss
Grams	250	40	192	18
% by weight original acids	—	16	77	7
Iodine Value (Wijs)	180	54	199	—

TABLE I

Saturated fatty acids were separated from soya bean oil by means of extractive crystallization and the unreacted raffinate was isolated and tested for film forming and drying properties. Ordinarily, soya bean oil dries slowly forming films with considerable after-tack. A typical soya bean fatty acid contains:

10 — 16% saturated fatty acids
22 — 29% oleic acid
50 — 55% linoleic acid
7 — 10% linolenic acid.

This combination has an iodine value of 120 to 140. As can be seen, approximately 35 to 45% of the fatty acids contribute little to the drying process. In treating soya bean fatty acids, the stearic and oleic acids were concentrated in the extract as expected, and the linoleic and linolenic acids remained in the raffinate. The unsaturated acids approached an average of two double bonds per molecule, based on iodine number values.

Paint Properties

In comparing the reconstituted glyceride oil made from the raffinate fatty acids with other natural and synthetic drying oils, it was found that the soya bean oil prepared from the urea-refined acids was up-graded to give a drying rate equal to or slightly better than linseed oil, but not quite as good as dehydrated castor oil. However, the surface tack and water resistance were superior to that of the dehydrated castor oil.

In a similar fashion, the removal of a large part of the non-drying fractions of linseed oil fatty acids improved the drying properties of the reconstituted oil to a point approaching that of tung oil. Fish oils and tall oil also show better drying properties after extractive crystallization with urea. Because the urea does not react with the odoriferous compounds in fish oil, it is possible to obtain odor-free oils from fish oils.

Despite the fact that extractive crystallization is still in an embryonic state, in some respects it is competitive with other present day commercial separation methods. It is particularly valuable for separating oleic acids from other poly-unsaturated fatty acids. The process can be carried out at room temperature, the urea is cheap and can be recycled. The main disadvantage is that the process requires large scale filtration, but fortunately the precipitate filters easily. Although a large amount of solvent is needed, this is not abnormal for an extraction process and is therefore not objectionable.

Demonstrations

Kobe and Domask list a number of simple test-tube demonstration experiments which will enable anyone to observe the ease with which urea and thiourea form adducts. These tests are reproduced here for the convenience of the interested readers. The formation of the adducts is generally instantaneous, at least to a certain degree of completion, and the experiments are designed to show in a striking manner the reactivity and selectivity of urea and thiourea toward certain organic compounds. It has been found that solutions of urea and thiourea in methanol are better for demonstrations of complex formation than aqueous solutions. Aqueous solutions may be used; however, the aqueous solution requires a certain amount of temperature control because of the high solubility of urea in water and because of the high temperature coefficient of the solution.

Octanol-Urea Complex — A saturated solution of urea in water plus n-octanol gives crystals at the interface. This reaction mixture is temperature sensitive. If the temperature is lowered a few degrees, the entire mixture will crystallize, whereas if the temperature is raised a few degrees, all of the crystals will dissolve.

Action of Urea — Urea is selective to long straight chain compounds; it will not react with highly branched compounds. This is demonstrated by the following experiments:

(1) A saturated solution of urea in methanol plus isooctane gives no precipitate.

(Turn to page 7)

Manufacturing Latex Paints

SUGGESTED OPERATING PROCEDURES

ALL equipment should be stainless steel, preferably # 318 stainless. Roller Mills usually are high carbon steel and will not corrode too rapidly; therefore, it will not be necessary to have stainless steel at this point.

For pigment dispersion, a Colloid Mill, as exemplified by the Premier Colloid Mill, Hy-R Speed or a Morehouse Mill can be used as well as Three Roll Mill, regular or high speed.

A suggested procedure would be to mix the protective colloid, the white pigment, the inert pigment and colored pigments in a lead mixer or a pony mixer and add to this dispersion the sequestering agent, the fungicides, the thickener and or any other modifying chemicals, bring this mix to a suitable consistency for grinding on a roller mill or a colloid mill. In grinding through the colloid mill the viscosity must be adjusted to get maximum sheer for the rated output of the particular mill.

After the pigment base is ground through your dispersing equipment, the latex is added, either in a conventional tinting tank with a post-mixer or in any stainless steel tank with a power driven mixer.

During the thinning stage it is important that the anti-foam agent be added and the speed and power of the equipment used for thinning be such that it will not whip in air into the mix. The motor on the thinning equipment should be of size that it will not supply more power than the mix requires. Colloid mills tend to whip in a lot of air in the grind. To off-set this characteristic it is necessary to keep a constant feed on the colloid mill using a gear pump for delivery of the paste.

The final thinning of the latex paint is the critical point in manufacture. Conventional mixing machinery has not proved too satisfactory. In this connection manufacturers such as: Lightnin Mixer Company, Turbo Mixer Corporation, Patterson Machine and Foundry, and others have done considerable work designing and developing the proper equipment.

In handling latex from drums, eliminate all free fall, which is a cause of foam. It is suggested that the latex be fed to the thinning tank by the use of a head of air acting as a cylinder on the latex in the drum, and that the latex be fed into the mixing tank underneath the pigment grind using a pipe to the bottom of the mixer and an "El" facing toward the direction of the rotating shaft.

To preclude the possibility of difficulty in the field, due to bacterial growth in the latex paint on the dealer's shelf, it is suggested that all manufacturing equipment be washed weekly, as well as the area around the equipment, with a solution of some type of bactericide or fungicide.

It is not necessary to buy new stainless steel equipment for the manufacture of latex paints since existing equipment can be spray-coated with stainless steel, either in your factory or in the plant of the company doing the spraying. As an example, Condenser Service Company of Hoboken, New Jersey, is a company set up to handle stainless steel spray coating.

Testing Dispersed Pastes

Latex White	132 gms
Dispersed Paste (standardized to 20% pigment content)	18 gms
Total tinted paint	150 gms

Procedure — Weigh latex white into

(*Turn to page 52*)

NEW PRODUCTS & IMPROVEMENTS

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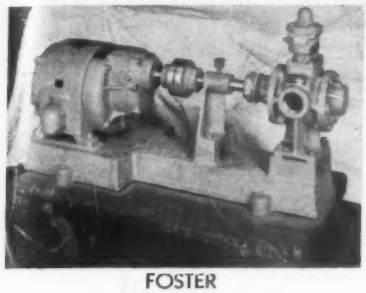

FOSTER

ROTARY PUMPS

For Latex Paints

The recent commercial development of latex-base paints has created several problems for the pumps used to handle this medium, that compelled considerable study and experiment before a solution was successfully arrived at.

First, the nature of the paint itself, with little if any inherent lubricating properties, indicated a necessary change of construction from that on the pumps regularly supplied to handle oil-base paint and varnishes. Secondly, the corrosive nature of latex-base paints requires the use of corrosion-resistant alloys in the construction of the pumps, whereas iron pumps have been satisfactory on the oil-base vehicles.

Because of the low lubricating value of latex-base paints, rubbing metal-to-metal contact in the pumps must be eliminated, while the corrosive nature of these paints make it necessary to use some form of the "stainless" alloys,(Stainless Steel, Copper-free Ni-Resist, etc.) to insure satisfactory performance.

Furthermore, because of the "layering" characteristics of latex-base paint, care should be taken to flush out and clean pipe lines and pumps immediately after using to prevent choking and clogging.

According to the manufacturer, plastic fitted rotary pumps, manufactured of a non-corrosive alloy solve the above pumping problems encountered with latex paints. Foster Pump Works, Inc., 50 Washington St., Brooklyn 1, N. Y.

PALLET

Increased Storage Capacity

Special pallet developed by handling engineers at the East Pittsburgh Westinghouse plant increased storage capacity of an outside drum storage area 100% by making it possible to fork truck the drums and stack them four-high in the yard.

Large enough to carry four drums at one time, the pallets are built with narrow wood stringers running lengthwise to keep the drums securely in place. As drums are unloaded from boxcars, they are rolled onto these pallets and taken by fork truck to storage. Baker — Raulang Co., 1230 W. 80th St., Cleveland 2, Ohio.

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ESSENCE SUBSTITUTE

Stable and Inert

"Nacromer" is a simulated substitute for pearl essence which, according to the manufacturer, has a brilliance comparable to the natural product at a fraction of the cost.

It may be mixed with paint or lacquer and applied by dip or spray methods. It also can be applied to wood, metal, paper, glass, ceramics, and plastics. Nacromer is said to be stable, inert, and non-corrosive.

Complete technical data and working samples are available on request to Mearl Corp., 153 Waverly Place, New York 3, N. Y.

CONVECTION OVEN

Improved Uniformity

Mechanical convection oven with a new method of forced air circulation provides constant air weight circulation at all temperatures, thus maintaining improved uniformity and control, greater economy and better results. Among the improvements made are the minimized test chamber temperature stratification, greater specimens-test uniformity, elimination of surface burns, visual evidence of air flow conditions, no blower noise or vibration, longer-lasting heater elements and air blowers. Emil Greiner Co., 20-26 North Moore St., New York 13, N. Y.

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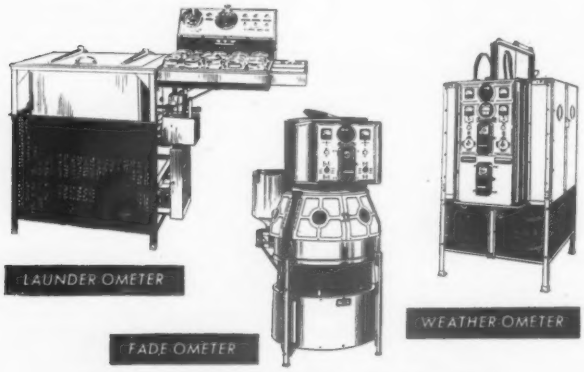
All Atlas Weather-Ometer tests may be precisely duplicated at any time. The machine may safely be left in continuous operation overnight, and can be set to shut itself off at any desired time.



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Gives Many Characteristics

Instrument provides comparative data on the drying and other properties of films after their application on a support (such as glass) of reasonably uniform properties. Principle of this instrument is based on comparative times of descent on various films of predetermined thickness. It is claimed that interpreting the times of descent of steel ball on coated and uncoated plates may be in terms of such characteristics as:

1. Tack of non-drying resins and elastomers. 2. Gelatin times of drying oils and high polymers. 3. "Consumer" drying time end points (set to touch, dust free, tack free, dry hard, dry hard-tack free), as well as long time conversion effects (print free to 2 and 5 psi), and the relative surface hardness of clears and pigmented films of every description. 4. Detection of the rate of drying and ultimate cure of the vehicle components of pigmented products of all categories, regardless of the degree of pigmentation. 5. Quantitative measurement, for the first time, of small differences in fineness of grind of dried films representing successive production runs of the same formula. 6. Effect of immersion in water and other liquids on film integrity at various stages of cure. H. R. Moore Co., 200 W. Montgomery Ave., Hatboro, Pa.

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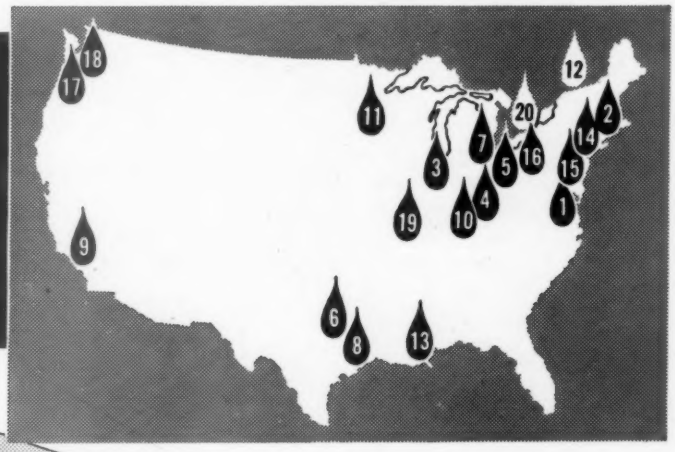

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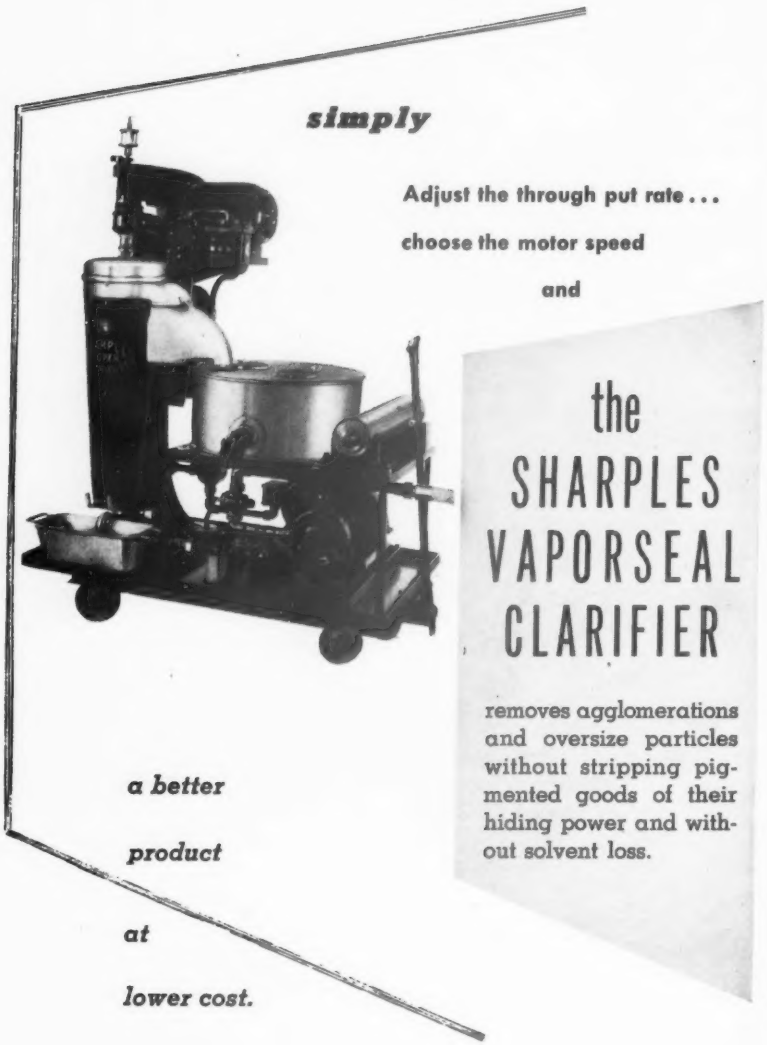

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Compound DL-22B consists of the latex, stabilizer, thickener, perservative, anti-foamer and other modifying ingredients. It exhibits the following properties:

Total solids (N.V.)	40.5 – 41.5
pH	9.6
Viscosity, Brookfield	1700 – 3500 cps
Sp. Gr.	1.02
Total solids per gallon	3.45

Formulations and processing data may be obtained from Plastex Products Co., Marietta, Georgia.

SYNTHETIC LATEX
New Type

New synthetic rubber latex known as Pliolite Latex 160 is said to be superior to any other paint latex the company has produced to date. According to the manufacturer, this superiority is manifested in finished paints by better scrub resistance, higher film hardness, less odor, excellent film clarity, alkyd compatibility, better particle size distribution, improved mechanical stability, and good brushing and application characteristics. Chemical Div., Goodyear Tire & Rubber Co., Akron 16, Ohio.

ALKYD RESINS
Reduced in Odorless Solvent

Syntex 141 and Syntex 71 are 2 new alkyd resins which, according to the manufacturer, make possible formulation of a complete line of odorless interior coatings. Both resins are reduced with odorless mineral spirits and are compatible in all proportions so that they can be combined to produce odorless semi-gloss undercoaters, sealers, and even 4-hour enamels and floor paints.

Syntex 141 is designed primarily for flat wall paints and Syntex 71 for gloss. It is reported that Syntex 141 produces a flat paint that is not only basically odorless during application, but also produces very little oxidation during the drying cycle. Resins and Chemicals Div. of Jones Dabney Co., Louisville, Ky.

NEWS DIGEST

Edward R. Drake

E.R. Drake Honored by Washington Paint Club

At a recent dinner, the Washington Paint Club honored Edward R. Drake, retiring secretary of the organization.

Mr. Drake held a number of positions with paint firms from 1886 to 1910. In that year he became editor of the Paint, Oil, and Drug Review. He served as sales manager of the Archer-Daniels-Midland Co. until 1933, when he resigned to devote his time to trade association activities.

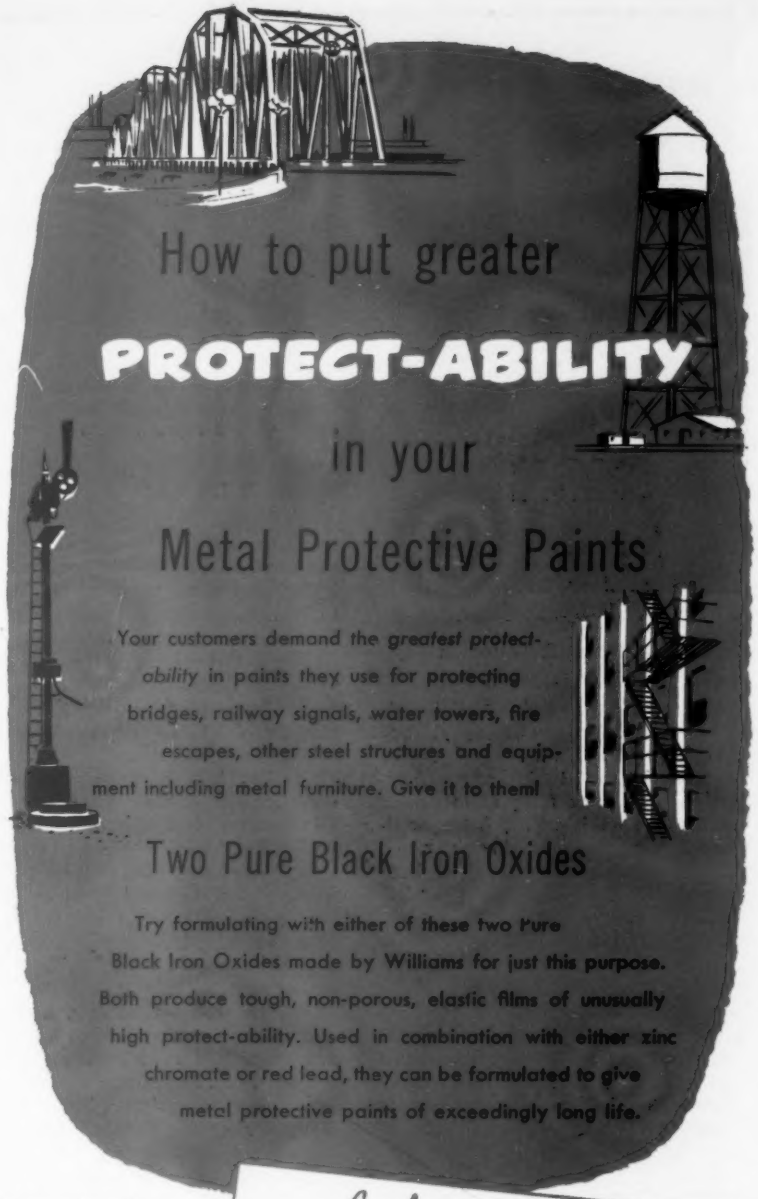
He was elected secretary of the National Association of Paint Jobbers, which later became the Wholesale Division of the National Paint, Varnish, and Lacquer Association in 1914. Mr. Drake, founder and secretary of the Fifty Year Club, resigned from the National Association in 1947. He has served as secretary of the Washington Paint Club since 1940.

In 1942 he took over as editorial director of Paint and Varnish Production Manager, holding this position until the magazine was purchased by Powell Magazines, Inc. in 1949 and renamed *Paint and Varnish Production*.

•

National Gypsum Company Forms Paint Sales Division

The National Gypsum Company, Buffalo, New York, as a result of acquiring Wesco Water Paints, Inc., has organized a paint sales division within its sales department. The division will handle sales under both the "Gold Bond" and the Wesco labels. J.W. Duncan has been named as division sales manager, and E.D. Shipman will serve as assistant sales manager.


How to put greater
PROTECT-ABILITY
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Metal Protective Paints
Your customers demand the greatest protect-ability in paints they use for protecting bridges, railway signals, water towers, fire escapes, other steel structures and equipment including metal furniture. Give it to them!
Two Pure Black Iron Oxides
Try formulating with either of these two Pure Black Iron Oxides made by Williams for just this purpose. Both produce tough, non-porous, elastic films of unusually high protect-ability. Used in combination with either zinc chromate or red lead, they can be formulated to give metal protective paints of exceedingly long life.

For samples, ask your Williams representative or write us today for complete technical information. Address Dept. 23, C. K. Williams & Co., Easton, Pa.

Analysis of Williams Pure Black Iron Oxides B-247 and BK-250

$FeO + Fe_2O_3$	96.0% Min.
FeO	20.0% Min.
H_2O Soluble	0.5% Max.
Sp. G.	4.96
Fineness thru 325	99.5
pH Value	7-9
Avg. Diameter	0.4 microns

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Dr. J. S. Long

Dr. Long of Devoe & Raynolds Named Fellow of Royal Society

Dr. James S. Long, chemical director of Devoe & Raynolds Company, Inc., has been appointed a Fellow of the Royal Society of Arts at London, England, by Sir Gerald Kelly, Chairman of the Society, William C. Dabney, president of Devoe, announced recently.

In recent years, Dr. Long has been ranked by the American Chemical Society as one of the top 10 scientists in the paint, plastics field, Mr. Dabney said. In 1949, the U. S. Federation of Paint and Varnish Production Clubs selected him to represent the American industry at two important scientific gatherings abroad — the International Industrial Fair at Basle, Switzerland, and the British Oil and Colour Chemists Association meeting at Rothesay, Scotland.

•

Kloss of Hercules Retires

A. Schubert Kloss, manager of production of the Naval Stores Department of Hercules Powder Company, will retire July 31, the company announced. He has been associated with the department's central offices in Wilmington, Del., since 1939.

Prior to that, he served for nineteen years as manager of a naval stores plant in Brunswick, Ga., manufacturing rosin, turpentine, pine oil, and chemicals derived from them.

Frank W. Volk, named manager of production with Mr. Kloss earlier this year, will assume full responsibility for that post following Mr. Kloss' retirement. Before transferring to Wilmington in January, Mr. Volk was superintendent of the naval stores plant at Hattiesburg, Miss.

Dr. Lal C. Verman, director, Indian Standards Institution, Delhi, addressing ISO technical committee on lac and shellac which met at the Hotel New Yorker.

Agreements on Shellac Standards Reached

Agreements on formulations of international standards for seedlac, shellac and bleached lac were reached during a 3-day session of the ISO Technical Committee on Lac and Shellac at the Hotel New Yorker (June 23-25). 20 experts and representatives from France Germany, India, United Kingdom and United States participated in the second meeting of TC 50 sponsored by the International Organization for Standardization. The discussions were under the chairmanship of Dr. Lal C. Verman, Director, Indian Standards Institution, Delhi. Leaders of the delegations were C. C. Hartman, USA; Jean Duval, France; Dr. Gerhard Buttner, Germany; A. J. Hill, UK; and Dr. P. K. Bose, India. Mr. Rochanapurananda, a technical expert from Thailand, was also present.

The committee used as a basis for discussion the proposals drafted at the first meeting of TC 50, which was held in New Delhi in January 1950. These proposals were considered in the light of comments received from member bodies of the committee and modified wherever necessary. Agreements were reached on practically all points at issue. These relate to definitions of terms, scope, methods of sampling and test and limits of requirements under various characteristics.

It was agreed that seedlacs, for purposes of international standards, should be classified, as originally proposed, in seven grades irrespective of their origin. It was also decided to carry on research with a view to evolving a bleachability test which would eliminate the use of standard seedlac samples and would otherwise be simpler. Some aspects of problems relating to color determination and cold alcohol insolubles would also be further studied with a view to evolving test methods acceptable to all concerned.

Shellac has been classified under 12 grades, six for handmade and six for machine-made. Shellac specifications cover button lac as well as dewaxed and decolorized varieties. Under bleached lac, specifications for wet bleached lac were discussed and incorporated in the test for regular and refined bleached lac. This was considered necessary as some countries produce and sell bleached lac in the wet condition.

These decisions, on an international level, are expected to lessen or eliminate misunderstanding and confusion which results from multiple national specifications and should therefore be equally welcome to producer, consumer, trade and other interests.

ADM Opens Sales Office in Frisco

Archer-Daniels-Midland Company opened a sales office at San Francisco July 1. The office, located at 1495 Custer Avenue, will be managed by W. A. Baker, formerly sales manager of A. J. Lynch and Company, San Francisco.

The San Francisco office will handle the complete line of ADM products which include the following: linseed oils, soybean oils, fatty acids, chemically modified oils, fish and other marine and vegetable oils plus various products manufactured by its Los Angeles plant.

Fellowship on Standardization Established at Mellon Institute

A Fellowship for conducting systematic studies of standardization and its applications in science, engineering, production and marketing has been announced by Dr. Edward R. Weidlein, President, Mellon Institute, Pittsburgh, Pa. This Fellowship will be sustained at the Institute by a grant from the Sarah Mellon Scaife Foundation of Pittsburgh, and its projects will be organized and supervised by Dr. Dickson Reck, Advisory Fellow. Dr. Reck will work in cooperation with research specialists of the Institute and with national authorities and societies.

ASTM Awards of Merit

Ten technical leaders in the field of engineering materials — men who have rendered outstanding service to the American Society for Testing Materials, particularly in its technical committee work — were honored during the ASTM 50th Anniversary Meeting in New York City the week of June 23 when they received Awards of Merit.

The following men received 1952 Awards of Merit:

W. P. Davey, Dept. of Physics, Pennsylvania State College, State College, Pa.

G. H. Harnden, Specifications Engineer, Standards Div., Executive Dept., General Electric Co., Schenectady, N. Y.

J. C. Harris, Assistant Director, Central Research Dept., Monsanto Chemical Co., Dayton, Ohio

J. J. Kanter, Directing Engineer, Engineering Labs., Crane Co., Chicago, Ill.

H. S. Mattimore, Engineering Consultant, Colonial Park, Pa.

D. E. Parsons, Chief, Building Technology Div., National Bureau of Standards, Washington, D. C.

H. M. Robinson, Service Engineer, Underwriters' Laboratories, Inc., Chicago, Ill.

J. D. Sullivan, Assistant Director, Battelle Memorial Institute, Columbus, Ohio

Ray Thomas, Staff Engineer, Carbide and Carbon Chemical Div., Union Carbide and Carbon Corp., S. Charleston, W. Va.

F. D. Tuemmler, Head, Analytical, Standardization Dept., Shell Development Co., Emeryville, Calif.

•

Committee D-1 Re-elects Pearce and Fasig

At its business meeting, Committee D-1 on Paint, Varnish, Lacquer, and Related Products re-elected W. T. Pearce, chairman, E. W. Fasig as vice-chairman. W. A. Gloger was elected secretary; A. J. Eickhoff, J. C. Weaver and Francis Scofield were elected to the Advisory Committee in place of J. C. Moore, G. G. Sward, and C. L. Crocket.

Committee D-1 celebrated its 50th anniversary with a dinner on June 24th. Several firms and individuals were honoered. John C. Moore acted as Toastmaster.

Present at a meeting of the Paint and Chemical Division of the Joint Defense Appeal were (seated, l to r) M. J. Schneider, vice president of the Chemical Bank & Trust Co.; M. H. Corbin, president, Standard-Toch Chemicals, Inc., and chairman of the Division; R. I. Wishnick, Witco Chemicals Co.; and A. E. Horn, Sun Chemical Co. Standing, E. Nathan, Sun Chemical Co., L. Francis Case, Central Paint & Varnish Works; William Wishnick, Witco Chemicals Co.; David H. Litter, of the company of the same name; and Lester Arnstein, Arnesto Paint Company.

Federation Convention Committees Named

C. J. Overmyer, chairman of the Federation of Paint and Varnish Production Clubs' Meetings Committee, has announced the names of the Committee Chairmen who will handle the functions of the Federation's 30th Annual Meeting in Chicago, Ill., November 20, 21, and 22, 1952.

The appointments are as follows:

Host Committee—H. H. Zimmerman

Ladies' Committee—Mrs. H. H. Zimmerman

Registration Committee—R. R. Bruhn

Floor Committee—A. F. Bohnert

Banquet Committee—H. G. Bogie

Entertainment Committee—W. A. Wachholtz

Dance Committee—A. P. Stresen-Reuter

Bridge Tournament—F. Scofield

The Ladies' Committee has been making a comprehensive survey of the activities which will be most interesting and entertaining for the ever-increasing group of lady visitors. A delightful time is assured for all the ladies who attend this meeting.

Both the Palmer House and the host city offer a wide variety of possibilities in the entertainment.

Concluding session of paint technology course at St. Joseph's College. (l to r) T. Shannon, assistant to college president; George P. Woodward, chairman, joint educational committee, Philadelphia Paint, Varnish, and Lacquer Assoc. and the Federation of Production Clubs; Miss B. Caniglia, receiving best student prize from F. Greenawalt, Nuodex Products; and Dr. Willard H. Manson, course instructor.

Peyton Wheeler

Edgar Brothers Co. Adds Wheeler to Research Staff

Peyton Wheeler has joined the research department of Edgar Brothers Company at McIntyre, Georgia. He was formerly with the Southern Research Institute of Birmingham, Alabama, where, as head of the Protective Finishes Research Programs for the past four years, he supervised studies and developments in the field of protective coatings.

In addition, Mr. Wheeler has held positions with many companies in the field, including Sinclair Refining Company, John A. Steen Research Laboratory, and the Jones-Blair Paint Company. He is a member of the American Chemical Society and the American Society for Testing Materials.

As a member of the research staff of Edgar Brothers, Mr. Wheeler will concentrate on the research and development of ASP pigments as inerts in protective coatings.

•

Goodyear Chemists Develop New Paint Processing Methods

Research by Goodyear Tire & Rubber Company chemists has resulted in the development of improved paint processing methods, enabling manufacturers to increase production or reduce milling time without decreasing quality in the output of most common paints.

A new concept, applicable to most paints manufactured in pebble or ball mills, was introduced by J. J. F. O'Neill and Robert Fremgen when they determined and used optimum paste compositions, pebble loadings, and paste loadings in the manufacture of Pliolite S-5 paints.

Employing these optimum conditions with four different types of Pliolite S-5 paints, the chemists obtained higher output per mill, improved grinds or shorter grinding times, greater uniformity of finished product, more brilliant colors and more complete color or tone development.

Pliolite S-5 is a high styrene-butadiene synthetic resin produced by the Goodyear Chemical Division and is used in exterior stucco, concrete, and masonry paints, concrete floor enamels, plaster sealers, chemical resistant finishes, and similar type coatings.

Using a method devised by Frederick K. Daniels, the scientists first determined the optimum paste compositions, the combination of Pliolite, pigment and solvent in which the pigment clusters can be most effectively dispersed.

With this information O'Neill and Fremgen then determined the optimum pebble mill loading of both pebbles and paste by further experimentation, measuring the time required to achieve specific fineness of pigment grind.

Results of the study were reported in a paper read by O'Neill, head of the paint laboratory of Goodyear's Chemical Products Development Division, before meetings of the Southern Federation of Paint & Varnish Production Clubs in Biloxi, Miss., and the Cincinnati, Dayton, Indianapolis and Columbus (Ohio) Production Club in Cincinnati.

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. . . INCREASES MILL ROOM CAPACITY. SYLOID 308 is a finely-sized synthetic silica of extremely high purity designed to produce a lower gloss finish. Less flatting agent is required . . . mill room capacity is often doubled. Rigid production controls insure a uniform product for uniform results.

SYLOID 308 gives superior results at lower cost. Great savings are gained in the mill room because Syloid mill bases can be made highly concentrated . . . with a very short grinding time. There is no mill base seeding.

For additional information or help on a specific problem write Davison's Technical Service Department.

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makes paints:
durable
brushable
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easy to apply
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starting formulations to help make superior paints

Dow Latex 744B, a vinyl latex, is the newest member of a distinguished line of Dow latexes. Exceptionally durable, Dow Latex 744B has high color stability and excellent light stability. It also lends itself to flame-resistant formulations.

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Ordnance Plans New Paint Qualified Products List

Ordnance Corps has announced plans to establish a qualified products list on military specification MIL-E-11857, enamel, synthetic, semi-gloss. Regarding correct submission of test samples, contact the Commanding General, Aberdeen Proving Ground, Md., Attention the Paint and Chemical Laboratory.

Samuel C. Robison Elected New President of Thibaut & Walker

The election of Samuel C. Robison as president and director of the Thibaut & Walker Co. of New York has been announced by Lawrence R. Bradley, chairman of the Board of Directors.

For the past few years, Mr. Robison has held the office of vice president and technical director of the company. He has had wide experience in the fields of vegetable oils, synthetic resins, alkyds, and latex. His recent association activities have included the chairmanship of the Sub-committee for Kauri Reduction Study of the American Society for Testing Materials Committee D-1.

ACP display. L to r, Wm. B. Boyer, J. Thirsk, a visitor, and F. P. Spruance.

Protective Coatings Exhibit Held in Washington June 20

A protective coatings exhibit, held at the Hotel Statler in Washington on June 20, was sponsored by Mr. Joseph Mazia, consulting engineer. Main theme of the exhibit was the application of protective coatings for steel, zinc, and aluminum to military products to increase their durability under service conditions. Among the exhibitors were the American Chemical Paint Company (ACP), Stoner, Mudge, Inc. (specification paint finishes) and Orchard Brothers, Inc. (metal specifications).

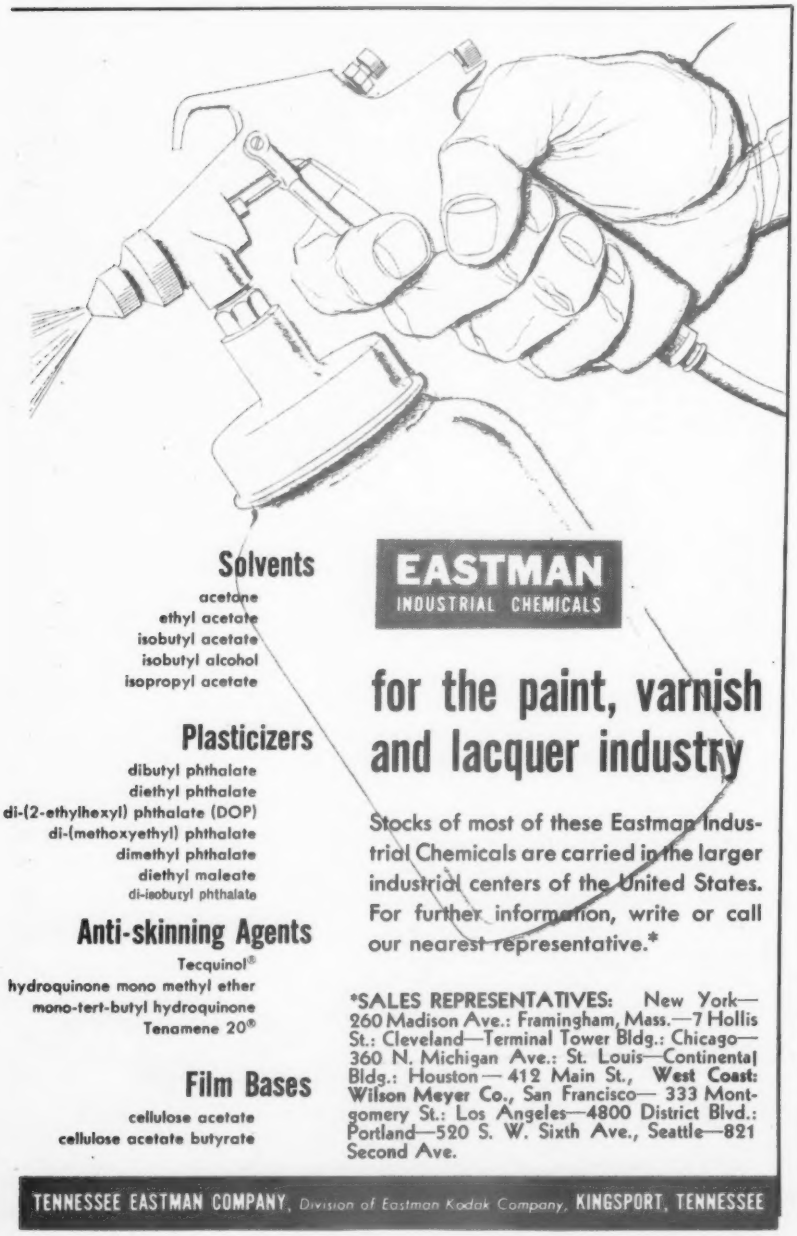
•

DeVilbiss Announces Schedule of Fall School of Spray Painting

The fall schedule for the DeVilbiss Company School of Spray Painting will include a course of instruction for contract painters and their representative starting Sept. 8 for five days. Classes will be held in the new school headquarters now in operation adjoining the main plant in Toledo. The school is entering its twenty-seventh year of training in the theoretical and practical phases of spray painting and is available on a tuition-free basis to users of DeVilbiss equipment.

However, during the months of July and August, no classes will be offered in Toledo because, for the first time, the school is being transferred temporarily to the West Coast. Starting July 6 and continuing through August, it will operate at the University of Santa Clara at Santa Clara, California, to enable Pacific Coast users to obtain training.

Applications for all classes on the fall schedule should be sent now to the DeVilbiss Company, Toledo 1, Ohio. Those interested may request School Form INS-753-A. There is no charge for attending, the only expenses being transportation, board and lodging.



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isobutyl acetate
isobutyl alcohol
isopropyl acetate

Plasticizers
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diethyl phthalate
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dimethyl phthalate
diethyl maleate
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PATENTS

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PATENTS AND COPYRIGHTS

424 Bowen Building,
Washington, D. C.

Complete copies of any patents or trade-mark registration reported below may be obtained by sending 50c for each copy desired to Lancaster, Allwine & Rommel.

Corrosion-Inhibiting Coating

U.S. Patent 2,596,450. Aaron Wachter and Nathan Stillman, Berkeley, Calif., assignors to Shell Development Company, a corporation of Delaware.

A corrosion-inhibiting composition essentially comprising a coating material capable of forming a substantially nonfluent coherent coating adherent on the surface of a solid metal, and an amount of an organic base nitrite sufficient to render the coating corrosion-inhibiting, said amount being about 10% by weight based upon the weight of said coating material.

Petroleum Coating

U.S. Patent 2,596,101. Lee Pritker, Baltimore, Md.

A coating composition consisting essentially of a tough, rubber-like, resilient resin of petroleum long-chain unsaturated hydrocarbons produced by air blowing at 450 to 575° F. of a propane precipitated viscous material from propane dewaxed straight cylinder stock of paraffin base petroleum origin, a nonpolar volatile solvent therefor in an amount which would produce a gel with the resin, and a polar solvent in amount to give the composition paint fluidity.

Ester of Chlorinated Phenoxyacetic Acid

U.S. Patent 2,596,089. William W. Allen, Ambler, Pa., assignor to American Chemical Paint Company, a corporation of Delaware.

An ester of an acid of the group consisting of 2.4-dichlorophenoxyacetic acid and 2.4.5-tri-chlorophenoxyacetic acid with an ether alcohol of the formula $R.O.CH_2.CH_2.CH_2.OH$, wherein R is of the group consisting of lower alkyl, benzyl and phenyl.

Cyclopentadiene-Tall Oil Compositions

U.S. Patent 2,598,424. Carl F. Peters, Chicago, Ill., assignor to Velsicol Corporation, Chicago, Ill., a corporation of Illinois.

A process for preparing a new composition of matter which comprises reacting cyclopentadiene and tall oil at a temperature of between 400° F. and 650°F.

Aqueous Dispersion Containing Silica

U.S. Patent 2,597,872. Ralph K. Iler, Cleveland Heights, Ohio, assignor to E.I. du Pont de Nemours & Company, Wilmington, Del., a corporation of Delaware.

A composition comprising an aqueous dispersion of a dispersed water-insoluble organic polymer and, per hundred parts by weight of polymer, at least two parts by weight of an alkali-stabilized colloidal silica of ultimate particle size less than 0.03 micron, the alkali being substantially all outside of the silica particles whereby condensation between the silica particles is retarded.

Cyclopentadiene-Resinous Materials

U.S. Patent 2,598,425. Carl F. Peters, Chicago, Ill., assignor to Velsicol Corporation, Chicago, Ill., a corporation of Illinois.

A process for preparing a new composition of matter which consists in thermally reacting cyclopentadiene and a reactant taken from the group consisting of rosin, abietic acid, polymerized rosin, and rosin esters at a temperature between 400 and 650° F.

Chats about Finishes

CONCERNING
STABILIZED PARLON®
by
FRED K. SHANKWEILER
Supervisor of Hercules' Chlorinated Products Sales

One of the major postwar developments in the industry has undoubtedly been the boom in rubber-base paints. Improving on chlorinated rubber formulas still further, Hercules recently introduced a stabilized grade which contains an epoxy-type stabilizer that is water insoluble, and compatible with resins and solvents normally used in formulating finished paints.

Stabilized Parlon—readily available at no extra cost—greatly improves heat stability, weathers better, and reduces under-film rusting. It retains the natural advantages of original Parlon—used for years because of its high resistance to alkalies, acids, fumes, and other corrosive elements.

If you'll write to me, I'll send a generous testing sample, and necessary technical data.

Fred K. Shankweiler

HERCULES POWDER COMPANY
INCORPORATED
Cellulose Products Dept., 926 Market St., Wilmington 99, Del.

Rust-Inhibitive Lead Pigments

U.S. Patent 2,597,645. Leonard M. Kebrich, Brooklyn, N.Y., assignor to National Lead Company, New York, N. Y., a corporation of New Jersey.

A process for manufacturing a litharge free red lead composition which comprises forming a water slurry of red lead containing free PbO and slowly adding to said slurry chromic acid in amount to convert said free PbO to lead chromate and filtering and drying the product.

Finishing Composition

U.S. Patent 2,596,960. Daniel Schoenholz, Bronx, and Herbert Terry, New York, N.Y., assignors to Foster D. Snell, Inc., a corporation of New York.

A finishing composition giving a bright drying film when applied as a thin layer and dried upon a surface, the composition being an emulsion in water of particles of a polyvinyl resin of size averaging not above 0.6 micron, a water insoluble solvent plasticizer for the resin serving as a film-coalescing agent, an emulsified bright drying polishing wax selected from the group consisting of carnauba, candelilla, montan, microcrystalline petroleum waxes, and mixtures thereof in the proportion of 3 to 30 parts of the wax on the anhydrous basis to 100 parts of the total materials other than water in the finishing composition, a non-cationic surface active agent that is soluble in water and dispersible in the resin, and a retarder of evaporation of water, the retarder of evaporation being a liquid of boiling point above 100° C. that is soluble in the mixed resin and said agent and infinitely soluble in water and the water constituting the sole readily volatile ingredient of the composition.

Modified Drying Oils

U. S. Patent 2,594,303. Charles H. Fisher, New Orleans, La., Morris Zief, Philadelphia, Pa., and Robert C. Hockett, Larchmont, N. Y., assignors to the United States of America as represented by the Secretary of Agriculture.

A composition comprising the oxidative copolymerization products of a drying oil and a polymerizable, organic solvent soluble monomeric ether of an aliphatic polyhydroxy compound, said ether containing in the ether group an alkenyl radical which is free of substituents other than halogen, which has from 3 to 4 carbon atoms and which contains the grouping

$$CH_2=C-C-$$

said ether being liquid in the monomeric form.

Cement Base Paints

U. S. Patent 2,600,018. Clare R. Nelson and Ralph E. Madison, Detroit, Mich., assignors to Truscon Laboratories, Inc., Hamtramck, Mich., a corporation of Michigan.

A dry Portland cement base paint composition in powder form containing a small amount of methyl cellulose in powder form.

Coating Compositions

U. S. Patent 2,600,593. Ira Weber, Brooklyn, N. Y., assignor to Interchemical Corporation, New York, N. Y., a corporation of Ohio.

The process of making a pigmented coating composition which includes the steps of incorporating coloring matter in a vehicle comprising a first resin as the binder, the said vehicle being characterized by having a lesser affinity for the said coloring matter than the condensation products and alkylated condensation products of formaldehyde with a member of the group consisting of urea, thiourea, guanidine, biuret, guanyl urea and dicyandiamide, and dispersing in the said vehicle as a second resin one of the said condensation products in form of fine, insoluble particles.

LANCASTER, ALLWINE & ROMMEL
REGISTERED PATENT ATTORNEYS

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Suite 424, 815 — 15th St., N.W.
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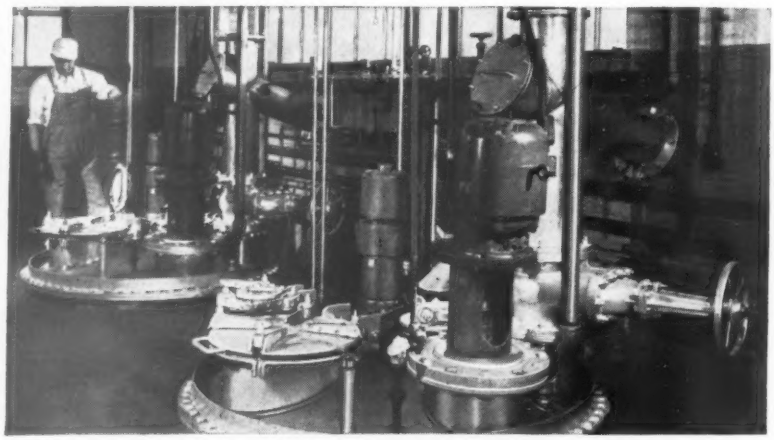
Patent Practice before U. S. Patent Office. Validity and Infringements Investigations and Opinions.
Booklet and form "Evidence of Conception" forwarded upon request.



The varnishes made in this plant are noted for their even-drying, high gloss, durability. The manufacturer states that the uniformity and high solvency of Sun Spirits are important contributing factors. He has used this "Job Proved" product more than 22 years and has never had a complaint.

WHY SO MANY PAINT MAKERS LIKE TO USE SUN SPIRITS

Sun Spirits is a carefully balanced product. It has good wetting-out power. Volatility is controlled to insure a rate of drying neither too fast nor too slow. Purity is checked and rechecked to make certain of a reliable, high-quality product.

In new formulas as well as old, and in experimenting with new materials, you can rely on the uniformity and quality of Sun Spirits. For more information, or the counsel of an experienced representative, just call your nearest Sun Office.

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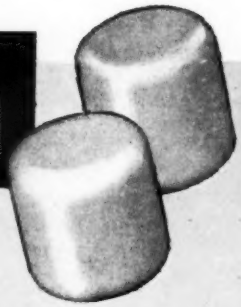
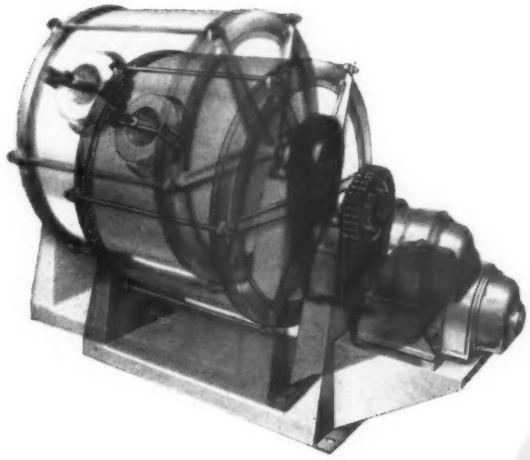
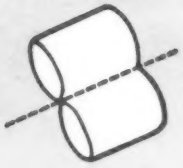
Burundum





It's a fact!! You'll see practically double the production from your mills when you use Burundum, the cylindrical grinding medium.

Many paint manufacturers are getting faster, finer grinds through the simple substitution of Burundum for other non-metallic media. One paint maker reports the grinding of a standard chrome green in an alkyd vehicle was accomplished in 23 hours with Burundum as compared to 46 hours for flint pebbles. Another slashed the grinding time of a gray enamel from 80 to 42 hours with Burundum. Still another ground a zinc chromate primer in just under half the usual time by using Burundum. You, too, can make substantial savings in time by switching to Burundum.



Burundum's tubular shape means greater grinding contact area. No matter how the media falls contact area is greater than the pinpoint contact characteristic of spherical media.

The main reasons for the greater grinding efficiency of Burundum are its unique form, high density, and high specific gravity. Combined, they give you faster action, greater attrition, less "floating" and "packing".

You'll also like the tough, impermeable surface of Burundum that makes for long, uniform wear — minimum contamination—easier, faster washing.

Why don't you get more out of your mills, by putting Burundum in?

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U. S. STONEWARE

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PROCESS EQUIPMENT DIVISION

103C

look at all the products made with **Soya Bean Fatty Acids**

If you use soya fatty acids in *any* of these applications, you want the unmatched quality and uniformity provided by *Gross'* Soya Fatty Acids.

Through the employment of special techniques and specially designed equipment, Gross can easily meet the demands of alkyd resin and other manufacturers for minimum color and chemical change under heat.

Send for samples and our booklet "Fatty Acids in Modern Industry." You'll agree that our products live up to the promises made for them.

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Distributors in Principal Cities Factory: Newark, N. J.

A. GROSS & Company
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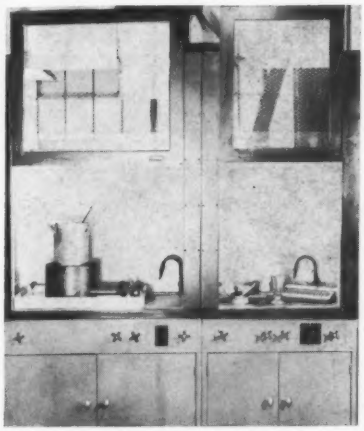
FACTORY NEWARK, N.J.

(*From page 22*)

char of the panel was materially reduced with the heavier paint coatings. The weight loss results did not show such a marked dropoff since the combustion of the paint would cause a definite weight loss that would not be reduced below that minimum point necessary for the retardation of the flame.



Varnish cooking facilities.

It was found that for adequate protection a 4 to 6 mil dry film thickness of the fire retardant paint was necessary. Less than this would be inadequate protection of the surface and more than this would not increase the protection enough to warrant the extra expense of application (unless the paint was so designed to give heavy film thicknesses in a single application). In addition, subsequent repainting operations would tend to build the film thickness up in time.

Effect of Various Surfaces

The poplar wood panels were considered to be a more severe and discerning test surface than the wall board panels. The range of results between a poor paint and a good paint was much broader on the wood panels than was the case with the wallboard. In addition, the wallboard panels would frequently glow under the surface where no paint coating could conceivably be expected to afford protection. This glowing would result in complete charring of the panel if allowed to continue unmolested. If the char was extinguished in order to determine the effects of the burning test, difficulty was experienced in achieving uniform and reproducible results because of the experimental errors introduced.

In view of some of the inadequacies in the commercial fire retardant paints, a formulating study for the purposes of developing adequate finishes was initiated under contract. This study examined the action of various types of pigments, vehicles, as well as the interrelation of these various factors. The results of this program are being studied to determine the best manner of utilizing the information developed.

Painting Barracks

UNDER Military Construction falls the responsibilities of erection and maintenance of the various military posts. In this operation the Corps of Engineers is frequently faced with difficulties that usually do not occur in civilian practice.

Military camps are almost always erected under adverse conditions of haste, inadequate construction help of somewhat limited skills, material shortages, and remoteness or inaccessibility of location. Once built and subjected to hard useage for a period of years, the camps are closed and receive

NEVILLE Resins
for PIPE COATING OILS
Being essentially hydrocarbon in nature, R-16-A Resin provides excellent water and salt spray resistance for pipe coatings as well as greater exterior durability.
R-16-A Resin is low in cost, compatible with all commonly used drying oils (including vegetable or marine types) and when used either alone or in conjunction with such oils yields coatings completely soluble in low-cost petroleum solvents.
We will gladly give suggestions on the use of R-16-A Resin to fit definite coating requirements.
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Plants at Neville Island, Pa., and Anaheim, Cal.
P-46

little care or maintenance. When reactivated, extensive repairing and repainting are necessary.

The Engineers Research and Development Laboratory is conducting a study for the Repairs and Utilities Division of Military Construction to obtain some answers on this problem. A program is being carried out at Fort Meade, Md. based on a comparison study of paints conforming to Federal Specifications TT-P-47, TT-P-51, TT-P-88, TT-E-506, and TT-E-508. In addition butadiene-styrene base paints will be included.

These various paints are to be applied to barracks under field conditions of application. Both unlined and lined barracks are being included in the program. The lined barracks are composed of wallboard lining, or plywood lining of various thicknesses. The shower rooms are to be painted with the above paints as well as with a zinc dust-zinc oxide coating conforming to Specification TT-P-641.

The program will determine the relative costs of painting an unlined building versus a lined building for each location, such as ceiling areas, above and below winscot for wall areas, and latrine areas. Serviceability and practicability of the various paint systems will be determined in order that standard methods of construction and maintenance may be evolved consistent with availabilities of materials, economy, and serviceability.

Pipeline Coatings

ANOTHER problem being studied by the Engineer Research and Development Laboratories is that of coatings for the interior and exterior of pipelines. These pipelines are to transport all grades of oil, gasoline, jet fuel and potable water. The coatings to be used must be durable under all climatic conditions from the frozen arctic to the humid tropics.

Corrosion Products

One of the difficulties experienced with most of the coated or uncoated pipes is that the corrosion products that form contaminate the liquids. When these liquids are filtered prior to storage, the filters are clogged. This results in frequent disassembly for maintenance as well as reduced output. Since a modern army is only as good as its fuel supply, maximum output is an important necessity.

One of the difficulties faced in coating of such pipe is that the pipe is to remain mobile or capable of being moved upon short notice. This prevents the use of the customary protective coatings used in civilian practice where a more permanent installation is usually the case.

Some sixty commercially available coatings were examined for their resistance to the various liquids, for their flexibility at various temperatures, abrasion resistance, and thermal and mechanical shock resistance. Those coatings which appeared to have the best combination of these properties were subjected to trial field tests. The results of the program are in the process of being studied and correlated in order to prepare adequate performance specifications for the procurement of suitable materials.

Fungus Control

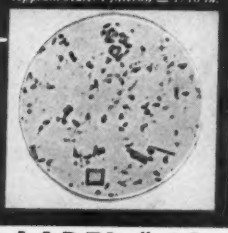
FUNGUS control of paints is necessary for the protection of equipment and material under tropical conditions. If a paint film is destroyed by the attack of such organisms, it becomes incapable of performing its necessary functions. In addition, the color or color properties of a film are of importance in achieving the desired camouflage effects. When covered

for all

PROTECTIVE COATINGS

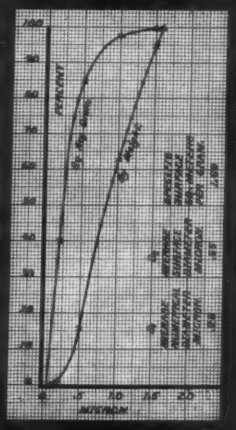
A versatile all-purpose, lead-free zinc oxide of intermediate oil absorption.

Magnification 1500X
Approx. Scale: 1 Micron = 1/16 in.



ST. JOE GREEN LABEL #40

Representative Chemical Tests	
ZnO	99.20%
Pb	.03
Cd	.01
Cl	.02
Acidity as SO	.15
Total S as SO	.20
H_2O Soluble Salts	.20
Insoluble in HCl	.15
Loss at 110°C.	.30
Representative Physical Tests	
Particle Size	
Average numerical diameter D_1 – microns	.28
Average surface diameter D_2 – microns	.65
Specific surface – Sq.M./gram	1.69
Bulking value – Gal. lb.	.02125
Percent fines under .50 micron	15.0
Specific Gravity	5.65
Apparent Density – lb./cu. ft.	32.
Cleanliness	
Percent thru 325 mesh screen	99.92
Oil Absorption – Rub-out	
Grams oil/100 grams ZnO	14.



Particle Size Distribution

ST. JOSEPH LEAD COMPANY
250 PARK AVE.
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Plant & Laboratory:
Monaca (Josephtown) Pa.

St. Joe **Green Label #40** has been used by the protective coatings industry for many years in a wide variety of products. Intermediate in particle size, it is recommended for use in exterior, interior, industrial and automotive finishes, and complies in all respects with the requirements of U.S. Government Specification TT-Z-301.

All our paint grade zinc oxides are described in our technical manual, ST. JOE ZINC OXIDES. Write for a copy — on your company letterhead please.

by organic growth, these optical effects are lost in addition to a shortening of the life of the film.

Approach

Two approaches were examined for evaluating the fungus resistance characteristics of paints. One of these was the construction of a tropical chamber which would simulate the results obtained under actual field conditions. It was desired to achieve these results on a uniform, reproducible basis and in an accelerated manner, if possible. In addition, it was necessary that results obtained in such a chamber would correctly predict what would occur in the field.

Tests

Since all suppliers would not be able to have such a chamber available for the examination of their products, it was desirable to develop a strictly laboratory test method that would also meet the above demands. In addition the method should be able to be redialy reproduced by any laboratory with the minimum of additional equipment.

This laboratory test method consists of brushing a controlled amount of paint on to a piece of filter paper. After the paint has dried, it is cut into 1¼ inch squares. These squares are then placed in a nutrient mineral agar and innoculated with the specified test organism. This prepared sample is then exposed for 10 days under elevated temperature and high humidity after which it is microscopically inspected.

Repeated tests with many types of paints with and without a wide variety of fungicides at varying concentrations has shown both the laboratory and tropical chamber tests to serve as satisfactory methods of fulfilling the desired requirements.

Personnel

Mr. A. W. Van Heuckeroth is Chief of the Material Branch of the Engineer Research and Development Laboratories where most of this work is carried out. Mr. R. W. Hill is Chief of the Protective Coatings Section which is specifically concerned with the above projects. Others in this group include J. M. Osborn, H. Miller, W. B. Mozo, M. Kornbluth, N. Dickinson, R. J. Brysson, and R. Edenton. Major A. J. Passonno, Research and Development Division, Office, Chief of Engineers aids in the coordination of these activities with other government agencies.

Dr. Guy C. Given of Du Pont Retires After Twenty-Six Years

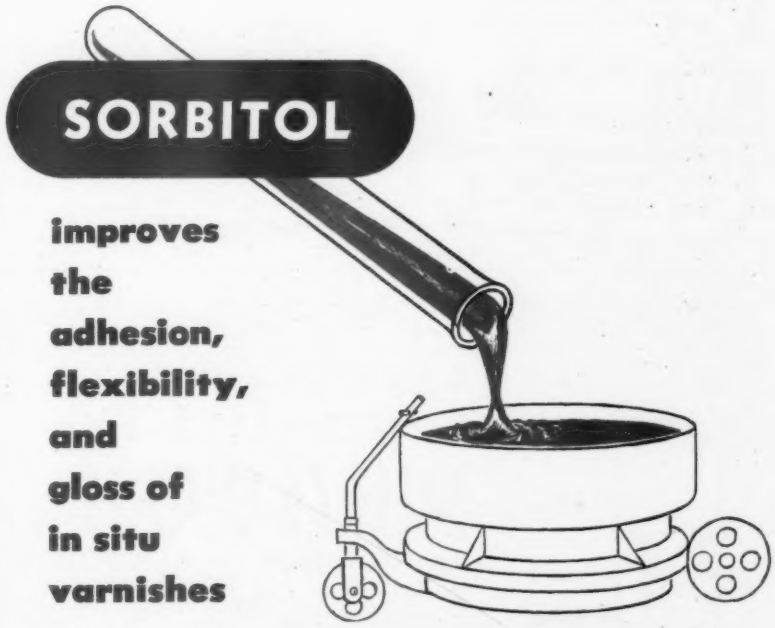
Dr. Guy C. Given, who managed the business phases of Du Pont's "Duco" lacquer licensing program, retired after more than twenty-six years with the company.

Dr. Given was with the Atlas Powder Company from 1917 to 1925. He joined the Du Pont Company in September, 1925, two years after the commercial introduction of "Duco" pyroxylin lacquers. When Du Pont extended its "Duco" lacquer licensing program in the early 1930's, Dr. Given was put in charge of the business phases of the program. He supervised the program and maintained liason between Du Pont and its licensees until expiration of the patents in 1944. In recent years Dr. Given has devoted himself to patent and technical development work in the finishes division.

•

Lewis & Company Distributor For Metals Disintegrating Company

The appointment of Lewis & Company, Louisville, Kentucky, as an MD distributor, has been announced by Metals Disintegrating Company, Inc., Elizabeth, N. J., manufacturers of metal pigments, metal powders and metal abrasives. They will serve as a distributor of MD Aluminum Pastes and Powders and MD Gold Bronze Powders in the Louisville area. Available stocks of MD Aluminum Pastes and Powders will be maintained in local warehouse facilities to provide immediate deliveries against urgent spot shipment requirements.



IN SITU varnishes made with sorbitol have better adhesion, flexibility, and gloss. And their drying time is faster! Being non-volatile, sorbitol gives greater safety in carrying in situ varnishes to high viscosities.

Sorbitol is the polyol of outstanding purity, color, and uniformity. On availability and price stability alone, sorbitol rates the "best buy" in polyols. Made from sugar, it is available in practically unlimited quantities; and, through the years, the price trend of sorbitol has been downward.

Write today for the valuable free booklet giving practical formulas and specific directions for making sorbitol-based vehicles. It includes many suggestions for *new* formulas.

ATLAS

Industrial Chemicals Department

ATLAS POWDER COMPANY

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Remove "Fish Eyes", Skins, Incidental Solids and Semi-Solids from Varnish and Lacquer with . . . .

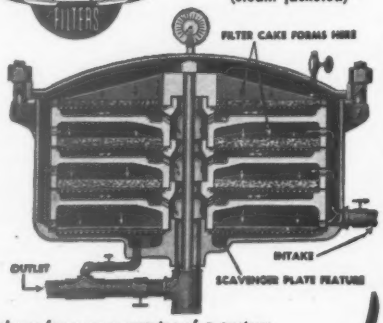
SPARKLER FILTERS

Model 18-S-12 Varnish Filter (steam jacketed)

Many varnish makers now use Sparkler Filters to clarify varnish, lacquers, and other clear liquids. The brilliance and polish obtained by filtering with Sparkler Filters is far superior to results obtained with other methods of clarifying paint products.

Our engineers are ready to give personal attention to your problems.

Write Mr. W. J. Kracklauer.



SPARKLER

MANUFACTURING COMPANY

MUNDELEIN, ILL.

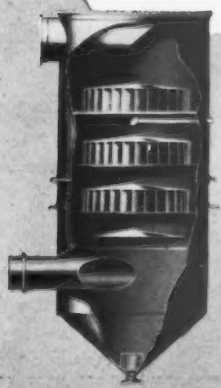
Makers of fine filtration installations for industrial use for over a quarter of a century

DUST
FUMES
VAPORS
OR GASES

EFFICIENTLY CONTROLLED BY

MULTI-WASH

MULTIPLIES WASHING FOR TOP EFFICIENCY



Only Schneible Multi-Wash collectors can give you the benefit of extra washing action that assures maximum removal of all contaminating material.

You can be sure of top efficiency with a minimum of up-keep because the Multi-Wash principle employs no moving parts or nozzles that can wear or clog.

Multi-Wash collectors installed 15 years ago are still operating which proves the Schneible principle gives lasting performance.

Write for bulletin 551 or contact your local Schneible representative.

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PRODUCTS:

Multi-Wash Collectors • Uni-Flo Standard Hoods • Uni-Flo Compensating Hoods • Uni-Flo Fractionating Hoods • Water Curtain Cupola Collectors • Ductwork • Velocitrap • Dust Separators • Entrainment Separators • Settling and Dewatering Tanks • "Wear Proof" Centrifugal Slurry Pumps

SCHNEIBLE

CALENDAR OF EVENTS

Sept. 9-11. American Soybean Ass'n. Annual Convention, Purdue University, Lafayette, Ind.

Sept. 14-19. Fall Meeting of Div. of Paint, Varnish and Plastics Chemistry, ACS, Chalfonte-Haddon Hall, Atlantic City, N.J.

Oct. 8-10. American Tung Oil Ass'n. Annual Meeting, Admiral Semmes Hotel, Mobile, Ala.

Nov. 17-19. National Paint, Varnish and Lacquer Ass'n. Annual Convention, Palmer House, Chicago, Ill.

Nov. 20-22. Federation of Paint and Varnish Production Clubs Annual Meeting, Palmer House, Chicago, Ill.

Nov. 18-22. Paint Industries' Show, Palmer House, Chicago, Ill.

Production Club Meetings

Baltimore, 2nd Friday, Belvedere Hotel.

Chicago, 1st Monday, Furniture Mart.

C.D.I.C., 2nd Monday.
Cincinnati — Oct., Dec., Mar., May, Cincinnati Club;
Dayton — Nov., Feb., April, Van Cleve Hotel;
Indianapolis — Sept., Claypool Hotel;
Columbus — Jan., June, Fort Hayes Hotel.

Cleveland, 3rd Friday, Harvey Restaurant.

Dallas, 2nd Thursday, No Fixed Place.

Detroit, 4th Tuesday, Rackham Building.

Golden Gate, Last Monday, El Jardin Restaurant, San Francisco.

Houston, 2nd Tuesday, Seven Seas Restaurant.

Kansas City, 2nd Thursday, Pickwick Hotel.

Los Angeles, 2nd Wednesday, Scully's Cafe.

Louisville, 3rd Wednesday, Seelbach Hotel.

Montreal, 1st Wednesday, Queen's Hotel.

New England, 3rd Thursday, Puritan Hotel, Boston.

New York, 1st Thursday, Building Trades Employers Assn.

Northwestern, 1st Friday, St. Paul Town and Country Club.

Pacific Northwest, Annual Meetings Only.

Philadelphia, 3rd Wednesday, Engineer's Club.

Pittsburgh, 1st Monday, Fort Pitt Hotel.

St. Louis, 2nd Tuesday, Forest Park Hotel.

Southern, Annual Meetings Only.

Toronto, 3rd Monday, Diana Sweets, Ltd.

Western New York, 1st Monday, 40-8 Club, Buffalo.

Personnel Changes

BAKELITE

Albert E. Maibauer has been appointed assistant to the manager of the New York sales development group. He has been with the company since 1925, primarily in the sales and development departments. In his new capacity, Mr. Maibauer will continue the work on the development of fluorinated resins begun in 1947. He has been with the sales development group since 1945. A chemical engineering graduate of Cooper Union, he is a member of the American Chemical Society, the American Institute of Electrical Engineers, and American Society of Naval Engineers.

Albert E. Maibauer

SHELL CHEMICAL

D. F. Bradley has been appointed manager of the Detroit district sales office. He succeeds W.E. Keegan, who has been appointed to the position of assistant to the vice president, marketing. Mr. Bradley joined Shell as a technical salesman in the Detroit office in 1947. From there he moved to the firm's New York office as manager of the solvents department of the Eastern Division. A graduate of Notre Dame, he was with the U.S. Rubber Company and Bradley Concrete Products Company.

D. F. Bradley

HERCULES POWDER CO.

Werner C. Brown has been named an assistant director of sales for the cellulose products department. He will be in charge of sales of cellulose gum. J. T. Skelly remains as assistant director of sales for the department, and will supervise sales of nitrocellulose and chlorinated products. A. R. Olsen will succeed Mr. Brown as manager of CMC sales and J. B. Martin will succeed Mr. Olsen as manager of molding powder sales in the cellulose products department.

BOSTON VARNISH CO.

William V. Binder has resigned his position as chief chemist. Benard MacDougall, assistant superintendant, will temporarily supervise the laboratory activities.

MOREHOUSE

Mrs. Dorothy B. Smith has been appointed to act as direct representative in the Seattle area. Offices are at 1016 First Avenue South, Seattle 4, Wash.

PACIFIC VEGETABLE OIL

W. Ronald Benson, Inc., has been appointed the Oregon and Washington sales agent for P.V.O. The sales firm's offices are at 558 First Street South, Seattle.

HOOKER ELECTROCHEMICAL

John P. Edwards and Carl I. Gochenour have been transferred from the development and research department to the sales department.

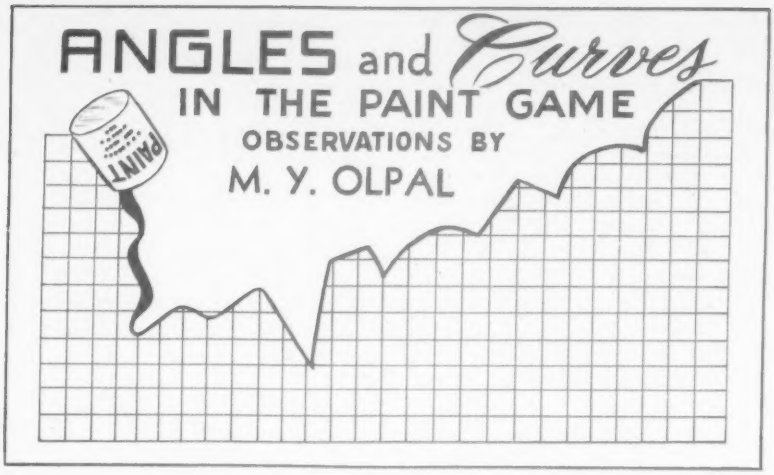
John T. Walmsley and Frederick W. Bonacher, Jr., chemical engineers, have been transferred to the sales coordination office of the sales department at Niagara Falls, N.Y.

NPV & L ASSN.

Lowell A. Elliot, secretary of the Industrial Products Finishes Steering Committee, becomes director of the Industrial Product Finishes Division.

E. E. Hoffman, formerly director of the Industrial Product Finishes Division, becomes director of the Production and Statistical Division. He continues his duties with the Credits and Collections and Safety Committees.

A. W. Ayers, Jr., has been appointed chief of the Statistical Section.



"That guy is just plain looney", Janie muttered. "D'je know what he called me?" On his way out he put on a big grin and said "goodbye Miss Manager." I wonder what he meant?

I tried to tread carefully, like an elephant walking on snowshoes when I told her, "He means a manager is someone who makes you jumpy and you wonder what to do next when he's around. That's how you impressed him dame." I referred to the outstanding effects created by her new outfit. A quick smile of understanding then a pucker of thought.

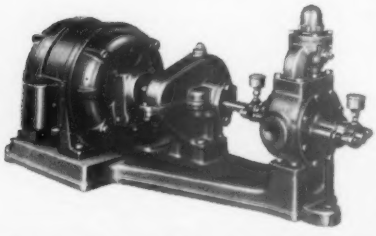
"That's not the way I get it," Janie tossed at me verbally, of course. "I heard it this way, a manager is like a married woman, experienced enough never to be surprised at anything and equipped to handle all emergencies."

Of course Janie had the right slant on the subject again. I agreed and told her one of the new jobs a manager had to take on is to anticipate the effects technical changes have first on business trends, then on business profits. To make it simple I said — "He has to think way ahead."

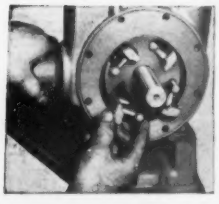
One of the economic aspects of the paint industry is the way things interlink. No change can be made in one raw material without serious effect on another.

Then I told her the alcohol story. Just after the war ended alcohol jumped to about a "buck" a gallon. It held over 89 cents for about a year. While ethyl alcohol was high, the cold-cut boys in our shellac department started to use isopropyl alcohol instead of ethyl alcohol; the isopropyl being much cheaper. And the solvent boys in our lacquer shop replaced alcohol with acetone. But alcohol later dropped back to 25 cents a gallon. Then if the guy who sells us isopropyl wants to keep on selling us, he has to drop his price. But remember we first bought isopropyl at his regular price because it was cheaper than

YOU NEVER SCRAP
PUMPS LIKE THESE!
(They're BLACKMER PUMPS)



2 VANE TYPES



HERE'S WHY...
Blackmer Rotary Pumps are self-adjusting for wear. When finally worn out, change the vanes, like changing blades in a razor, and you save the cost of a new pump.

Learn how Blackmer's two vane types offer the most efficient pump for your specific applications. Write for Folder "G-1-A" . . .

BLACKMER PUMP CO., GRAND RAPIDS, MICH.

GLIDDEN
NELIO
GUM ROSIN
"The Standard Rosin of the World"

7 UNBEATABLE POINTS OF SUPERIORITY . . .

1. Uniform
2. Brilliant and Clean
3. Exclusive Vacuum Process
4. Highly Controlled
5. Low Fatty Acid Content
6. Highly Maleic Reactive
7. Free from Residual Turpentine

This specification rosin assures you the best, most dependable results and frees you from the troubles arising from use of ordinary gum rosins.

Shipped in standard non-absorbent, leakproof metal drums, 100 lb. net weight paper bags or fluid in insulated tank cars. Grades WW through H. Write for samples and prices.

THE GLIDDEN COMPANY - NAVAL STORES DIVISION
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Cleveland
2775 Moreland Blvd., S.E.
At Shaker Square

San Francisco
603 Market Street

ethyl alcohol. Is this a surprise to him? Then the fellow who sold us acetone was up the same creek; if he wanted to hold his business he had to drop his price too.

"So what does that have to do with our manager? " Janie piped out. Didn't Janie know the answer to that one? I replied, "Do you know what new paints our competitors are hitting the market with, and which of these will displace paints we are now selling?"

"Well, I have to know and I have to make sure our management knows what effects new paints will have on our markets. Then we can decide how to combat the situation and take this necessary steps before we get caught unprepared."

"What you're trying to say makes sense," Janie smiled. Then she came out with a remark I couldn't answer. She grinned, "you want to be a fellow who does not want to get caught with his pants down."

•

All Sales Activities of Bakelite Consolidated

H. S. Bunn, president, Bakelite Company, a Division of Union Carbide and Carbon Corporation, has announced a program for consolidation of all Bakelite's sales activities. The new program is designed to consolidate the sales activities formerly carried on by two separate groups known as the Thermoplastics Department and the Thermosetting Department.

George C. Miller has been named vice president in charge of sales, and will be responsible for all of the Company's sales. Clinton W. Blount becomes vice president and general sales manager. Mr. Miller and Mr. Blount were previously vice presidents and general sales managers, respectively, of the former Thermoplastics and Thermosetting Departments.

•

Loomis Talc Corporation Names Whittaker Distributor

The W.H. Loomis Talc Corporation, Governeur, N.Y. has appointed Whittaker, Clark, and Daniels, Inc., 260 West Broadway, New York 13, N.Y. as sales distributors of Loomis Fibrous Talc for Massachusetts, Rhode Island, Connecticut, New Jersey, and the southern part of New York State.

It is claimed that the fibrous talc's extreme whiteness and high reflectance make it useful as an extender and filler in paints, lacquers, surface coatings. It is also stated that the Loomis Fibrous Talc has a greater wetting property than the more slippery type of talc.

Advance Solvents and Chemical Appoints Barret & Breen Agent

The Advance Solvents and Chemical Corporation, New York, has named the Barret & Breen Company as its New England representative in the plastics, rubber, and adhesives field. The firm has its offices at 50 Congress St., Boston 9, Mass.

CHEMICAL ENGINEERING

(*From page 27*)

minimum labor, and therefore should not be crowded into a corner.

Operating techniques should include the maintainance of a permanent log of operations for possible future correlation of data, and prediction of results in scaled up equipment. The engineer in charge of operating the pilot system should familiarize himself with techniques of scale up, discussed in the literature. Armed with these techniques he can use data gathered in the pilot plant for design of plant size installations and improvement of existing facilities.

ACKNOWLEDGEMENT

For material assistance in the preparation of this talk, appreciation is due to the Industrial Engineering Department of the Brooklyn Union Gas Company, The Eclipse Fuel & Engineering Company and the Selas Corporation of America.

SPECIALIZED PICCO PRODUCTS FOR Paints, Varnishes, Lacquers

PICCOLYTE—A pure hydrocarbon, pale, non-yellowing, thermoplastic, terpene resin that is low in cost, soluble in low cost naphthas, chemically inert, compatible with waxes, resins, paint and varnish oils.

PICCOUMARON—A series of thermoplastic, para-coumarone, indene resins, soluble in coal tar, turpentine, terpene and most chlorinated solvents. Inert to all except strong concentrated acids.

PICCOLASTIC—Made in six types and seven melting points. Piccolastic Resins are pale, unsaponifiable, stable in package, body and film, soluble in low-cost solvents, acid and alkali resistant. Permanently thermoplastic.

SOLVENTS and SOLVENT OILS—A complete series of aromatic petroleum naphthas, coal tar naphthas, heavy naphthas, coal tar heavy naphthas, solvent oils and heavy oils. Each solvent is carefully fractionated so that product specifications are closely maintained.

PENNSYLVANIA INDUSTRIAL CHEMICAL CORP.
Clairton, Pennsylvania
Plants at: Clairton, Pa.; West Elizabeth, Pa.; and Chester, Pa.
Distributed by Pennsylvania Salt Chemical Co., Pittsburgh 30, Pa.

HILTON DAVIS

Joseph A. Langer has been named manager of pigment sales by the Hilton-Davis Chemical Co., a division of Sterling Drug. Hilton-Davis recently assumed national sales direction of its products to the paint industry, a function which had previously been performed by Taylor Greenwald Company, Norwood, Ohio. Prior to joining the firm, Mr. Langer was associated with the Interchemical Corporation Finishes Division. He attended Northwestern and Miami Universities, as well as the University of Cincinnati.

Joseph A. Langer

AMERICAN CYANAMID CO.

R. C. Safarty has been appointed manager of the new sales service department of the Industrial Chemicals Division. Mr. Safarty is former product supervisor for Industrial's Heavy Chemicals department. Within the sales service department, **E. O. Heydt** will be in charge of the trade record section, and **A. L. Wycoff, Jr.,** will supervise the order processing section.

CANCO

Frank E. De Luca has been appointed sales manager of the newly created Long Island sales district of the American Can Company. Mr. De Luca, with the company's sales department for 35 years, was assistant sales manager of the Manhattan district.

BINNEY & SMITH

Lewis B. Smith has been transferred from the technical service department to the sales department in the capacity of assistant sales manager, Specialty Blacks division. Mr. Smith joined the firm in 1949 as a technical service representative in the non-rubber division. He was formerly associated with the research department of C. K. Williams & Company, and with the Calco Chemical Division of American Cyanamid. A chemical engineering graduate of Northeastern University, he is a member of the American Institute of Chemical Engineers and the American Chemical Society.

Lewis B. Smith

PITTSBURGH COKE AND CHEMICAL

Marvin O. Shrader has been appointed supervisor of organic chemical research in the research and development department. Dr. Shrader, who spent ten years with General Aniline and Film Corp. before joining Pittsburgh, has a Ph. D. in Organic chemistry from Yale, and is a member of the American Chemical Society.

SOLVENTS - ALCOHOLS EXTENDERS

ALCOHOLS

Methanol
Proprietary Solvent
Isopropyl Alcohol
Normal Butyl Alcohol
Isobutyl Alcohol
Methyl Amyl Alcohol

KETONES

Acetone
Methyl Acetone
Methyl Ethyl Ketone
Methyl Isobutyl Ketone
Diacetone Alcohol
Isophorone
Diisobutyl Ketone

ESTERS

Methyl Acetate
Ethyl Acetate
Isopropyl Acetate
Normal Butyl Acetate
Methyl Amyl Acetate
Dibutyl Phthalate
Diethyl Phthalate
Dimethyl Phthalate
Tricresyl Phosphate

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Toluol
Xylol
HiFlash Naphtha

CHLORINATED SOLVENTS

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Carbon Tetrachloride
Perchlorethylene

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JOHN H. CALO COMPANY
INCORPORATED

19 RECTOR STREET
NEW YORK 6, N. Y.

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LATEX PAINTS

(*From page 30*)

400 cc beaker. Weigh paste into same beaker, taking care to avoid any on walls. Use a glass rod tipped with a rubber policeman to make preliminary stir. Stir 80 times, then scrape down sides to mix any white or color clinging there. Stir an additional 20 times. Stir 10 minutes mechanically to insure thorough development.

Make drawdowns with Bird applicator on special paper. If desired, brush out on card stock.

Keep for a week or so in convenient closed container. Grind a small portion of same paint in a mortar and brush out next to as-is brushout in order to check for complete color development.

Observations — Note ease of mixing during stirring. Note body and change on standing.

Note strength, other color characteristics, and streaking on drawdown.

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Paint Filler with Cover Dropper & Capper

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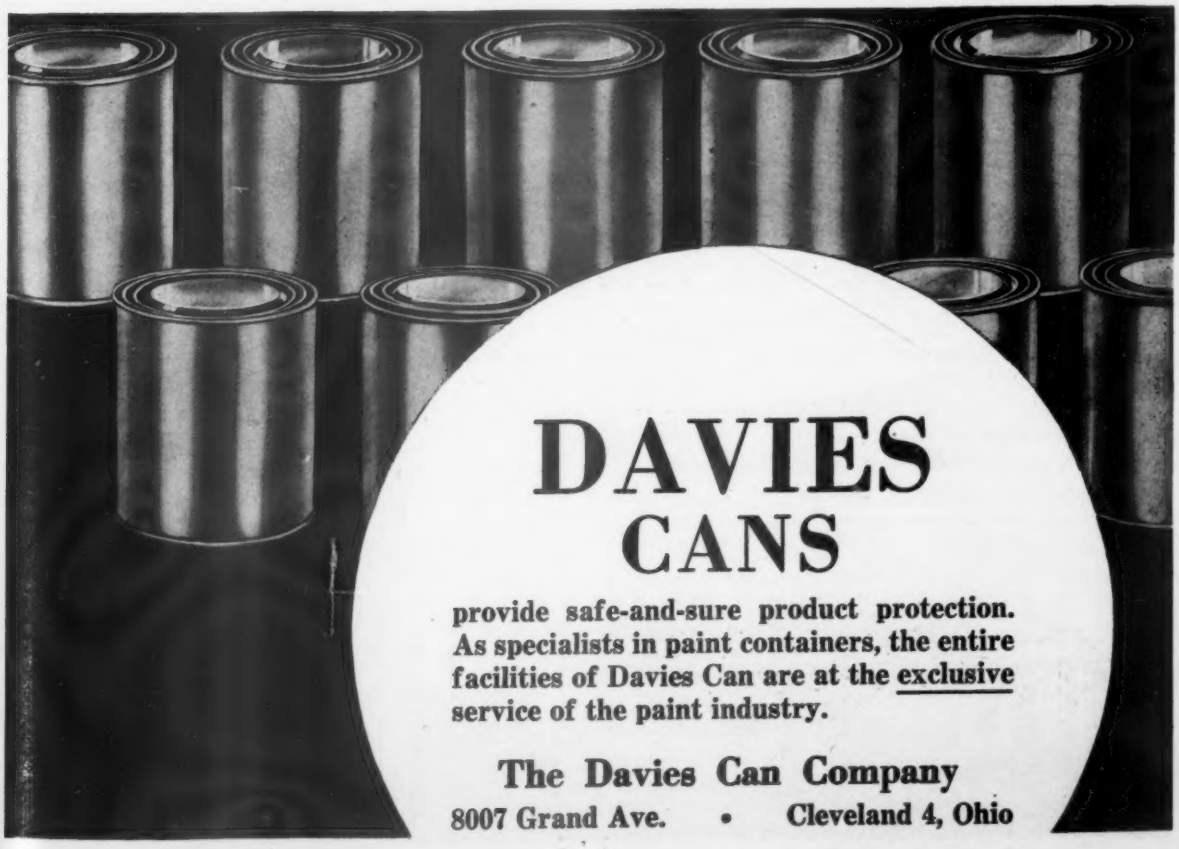

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TECHNICAL Bulletins

VINYL DISPERSIONS

Sixteen page bulletin describes techniques for converting plastisols to plastigels which process at room temperature and low pressures. Other factors covered are mixing methods, flow properties of plastigels, effect of plasticizer and gelling agent, fillers, formulation, for physical properties. Bakelite Co., 30 East 42nd St., New York 17, N. Y.

SOLVENTS IN HOT LACQUER

Effect of solvents on such properties as viscosity, spraying characteristics, evaporation rates, pinholing, drying time, flow, gloss, and after-shrinkage is discussed in 16 page bulletin. Included are graphs relating viscosity to temperature, type of solvent, and other additives. Shell Chemical Corp., 500 Fifth Ave., New York, N. Y.

TEMPERATURE CONTROL

The Burling Instrument Company of South Orange, N. J., has published a 12 page illustrated catalog, No. G-17, which describes their full line of temperature Controls.

Special features of this catalog are the additions of four new instruments and inclusion of tables of application and performance for all instruments.

A copy of catalog G-17 will be mailed on request.

MIXING MACHINES

Intensive mixers, dispersion machines, mixing machines and kneading machines are described in a four-page bulletin. Designed for processing a wide range of materials, this line of machines is for heavy duty intensive mixing through light duty mixing and kneading.

Featured in the bulletin is the Struthers Wells intensive mixer. In addition to descriptive data, the bulletin includes a chart which gives capacity, series number, rotor RPM and horsepower for the 19 standard sizes of Intensive Mixers.

Thirteen standard sizes of dispersion machines, mixing machines and kneading machines also are considered in the brochure. These range in working capacity from 1 through 1000 gallons.

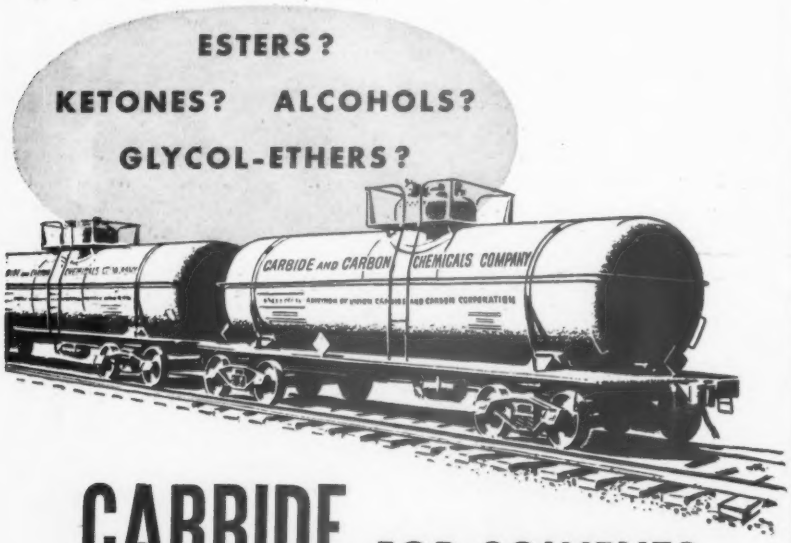
Copies of Bulletin T-452 may be obtained from Struthers Wells Corporation, Mixer Division, Titusville, Pa.

LATEX 744-B

A technical data bulletin on the use of Dow Latex 744-B in paint has been issued. A number of commercial paints based on Dow Latex 744-B are now on the market. The bulletin offers paint manufacturers preliminary suggestions on the methods of making paint, and recommends the types of alkyds to be used with this latex. Starting point formulations as well as properties of the material are listed. Some of the other topics discussed are: methods, pigmentation, protective colloids, thickeners, and pigment dispersants. The bulletin is available through the plastics sales department, The Dow Chemical Company, Midland, Michigan.

RESIN DATA

A technical booklet containing practical application data and starting formulations for the use of



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"Neolyn" resins in adhesives, plastics, lacquers, and organosols is now available from the Hercules Powder Company, Wilmington, Del. Technical information about the general properties of "Neolyns" as well as the specific properties of each of the seven resins in the series and performance characteristics are included in the booklet.

GAS BURNERS

Multiport flame type gas burners are the subject of this new bulletin. The burners are used in heat processing such as high temperature alloy brazing; glass fire polishing; heating solder pots, core ovens and die molds; soldering; baking; tempering and hardening. The burners can be used with any commercial fuel gas and in any air-gas mixing system that develops the required mixture pressure. Capacities and specifications are given with appropriate dimensional drawings. "Selas P-R Gas Burners." Bulletin SC-1000. Four pages. Selas Corporation of America, Philadelphia 34, Pa.

SUSPENDING AGENTS

The American Cyanamid Company, 30 Rockefeller Plaza, New York, has published a technical data sheet, "Cyanamid aluminum and Calcium Stearates as Pigment Suspending Agents in Flat Wall Paint." Aluminum and Calcium Stearates are compared for the following properties: fineness of grain, viscosity before and after grinding, viscosity krebs after storage, viscosity increases, settling after storage, gelation, brushing characteristics.

PUMP

Specification folder gives complete description of pump capacity, design features, specifications and dimensions of Model P-104 pump. Copies may be obtained by writing to Kenco, Inc., 1125 North Ridge Rd., Lorain, Ohio.

HEAT SEAL COATINGS

Data sheet C-66 describes a number of heat seal coatings formula designed for use on paper, glassine, aluminum foil, and cellulose acetate. American Resinous Chemicals Corp., Peabody, Mass.

PORTABLE MIXERS

Bulletin no. 52A describes and illustrates new Pie-Flex mixer with detached motor coupled to mixer by flexible drive shaft. Contains table of motor and propeller sizes for different shaft speeds, and lists typical applications. Process Industries Engineers, Inc., Pittsburgh, Pa.

PHOTOELECTRIC EQUIPMENT

Catalog of photoelectric equipment for industry has been published by De-Tec-Tronic Laboratories, Inc., 1711 Terra Cotta Place Chicago 14, Illinois. This catalog illustrates and describes a complete line of amplifier-relays and light source and phototube units with design standardized to eliminate the high cost of specially engineered apparatus.

RESINS PATENTS AND RESEARCH

Selection of translation of recent German patent applications and German and Russian research reports on plastics and synthetic

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rubbers is presented in the latest Research Bulletin issued by Research Information Service, 53 Nassau St., New York 38, N, Y.

Their bulletin No. 64, entitled "Plastics and Synthetic Rubber", discusses the strides made by the foremost German manufacturers in the perfecting of industrial processes and the development of new products, and offers an interesting sidelight on the problems investigated by Russian scientists.

METALLIC STEARATES

"Cyanamid Metallic Stearates", is a booklet which describes revised specifications of many grades resulting from recent research by the company in the stearate field. The revisions include controls on the purity and uniformity of the component fatty acids and extremely low limits of lead and arsenic. The booklet also lists the entire line of Cyanamid's metallic stearates which are used in numerous industries including the petroleum, rubber, plastics, ceramics, and surface coating.

For copies of "Cyanamid Metallic Stearates", write to American Cyanamid Company, Industrial Chemicals Division, 30 Rockefeller Plaza, New York, New York.

PLASTICIZERS

Technical data bulletin on some of the plasticizers made by The Dow Chemical Company is available from the company's Plastics Sales Department, Midland, Michigan.

The bulletin, designed to assist manufacturers im making proper selection of plasticizers, gives the sales specifications, typical properties, compatibility or solubility of these materials and their uses.

MILDEW PROOFING AGENTS SPECS

Revised and expanded technical service report covering mildewproofing agents with respect to government specifications has been made available by the Witco Chemical Company. The report contains brief summaries of many government specifications calling for mildewproofing of canvas, cotton duck, burlap, rope, net, webbing, cord, belting, thread, twine and felt.

Also included are descriptions of the methods used in mildewproofing and the products, such as 8 per cent copper naphthenate, used. Finally, there is an index of the specifications abstracted so any particular specifications can be easily located.

For copies, write to Witco Chemical Company, 295 Madison Avenue, New York 17, New York for Report P-17A.

STYRENE ALKYD

Technical report describes styrene modified alkyd-type resins which can be formulated as baking enamels or as air-drying enamels. The report contains information on formulation and procedure for performing styrenation, the effect on the rate of conversion and reaction product with variation in the alkyd acid number and the carboxyl — hydroxyl ratio; viscosity and type of oil modifiers. Monsanto Chemical Co., Texas Div., Texas City, Tex.

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CRYSTALLIZATION

(*From page 29*)

(2) A saturated solution of urea in methanol plus isoctane plus a long straight-chain hydrocarbon forms a crystalline complex immediately, composed of urea and the straight-chained hydrocarbon.

Action of Thiourea — Thiourea complements the reactions of urea with organic compounds. Thiourea will not react with long straight-chain compounds, but contrary to the behaviour of urea, thiourea reacts with certain cyclic and highly-branched compounds.

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(2) A saturated solution of thiourea in methanol plus methyl cyclohexane gives crystalline complex formation immediately.

(3) A saturated solution of thiourea in methanol plus a long paraffin gives no precipitate, but when carbon tetrachloride is added, a crystalline complex forms immediately, between carbon tetrachloride and thiourea.

Dissociation of Adducts — The crystalline complex is dissociated by heating or by being mixed with water. As a rough comparison with the industrial application, a warm saturated solution of urea in water added to a mixture of isooctane and long straight chain hydrocarbons gives a crystalline complex consisting of the normal hydrocarbons and urea. The slurry is filtered and washed; acetone may be used. The crystals which have been washed free of any occluded insoluble hydrocarbons, are then mixed with water, causing dissociation of the complex as evidenced by the dissolving of urea in water and by the layer of long straight-chain hydrocarbons which forms above the water.

Cincinnati Is Try-Out City For Aluminum Paint Promotion

The Reynolds Metal Company is running a test market campaign in Cincinnati on general purpose aluminum paints and asphalt-aluminum roof coatings made by paint manufacturers under the trade name, "Liquid Aluminum". In addition to intensive radio and newspaper advertising, a complete paint manufacturer-jobber-dealer merchandising program is underway.

•

New Address For Shell Chemical Newark Office

The Newark sales district of Shell Chemical Corporation has moved its offices from the Raymond Commerce Building at 1180 Raymond Boulevard to larger quarters at 10 Commerce St., Newark 2, N.J.

CLASSIFIED ADVERTISEMENTS

Rates: $.20 per word, except those seeking employment, for which rate is $.10 per word. Minimum: ten words. Address all replies to Box Number, c/o Paint and Varnish Production, 855 Avenue of the Americas, New York 1, New York.

PAINT CHEMIST WANTED — man with at least two years experience in the formulation of trade sales finishes. Excellent opportunity with Raw Material Sales Service Laboratory in New York Metropolitan area. Advise salary desired in reply. All answers will be kept in strictest confidence. Box 142

CHEMIST WANTED — Well known miners and manufacturers Talc and Mineral Fillers have opening for experienced chemist. Experience in paint formulation, fine grinding, particle separation, insecticides helpful. Opportunity for right man with real ambition whose interest is in developing new products, testing, quality control. Permanent position only. Send complete data including education, experience, age, etc. Satisfactory salary and housing allowance. Our personnel knows of this ad. All replies confidential. Carbola Chemical Co., Inc., Natural Bridge, N. Y.

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Lacquer manufacturers have discovered that Amyl Acetate HB helps make lacquers resistant to blushing at extreme humidities. And in hot lacquers, its flow-promoting properties are outstanding. Where evaporation-retarding properties are required, investigate CSC Amyl Acetate HB. Write Industrial Chemicals Division, Commercial Solvents Corporation, 260 Madison Avenue, New York 16, N. Y., for full information.

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AMERICAN CHEMICAL PAINT COMPANY

AMBLER CHEMICALS ACP PROCESSES PENNA.

Technical Service Data Sheet

Subject: INDEX OF ACP CHEMICALS FOR METAL PRESERVATION AND PAINT PROTECTION

METAL	OPERATION	ACP CHEMICAL
ALUMINUM	Cleaning	"DEOXIDINE" "DURIDINE" "ACP RIDOLINES AND RIDOSOLS"
	Preparation for Painting	"ALODINE" "DURIDINE" "DEOXIDINE"
	Protection from Corrosion	"ALODINE"
BRASS	Brightening	"ACP BRIGHT DIP"
	Cleaning	"DEOXIDINE" "DURIDINE" "ACP RIDOLINES AND RIDOSOLS"
	Cleaning for Painting	"DEOXIDINE" "CUPROTEK"
	Corrosion Prevention	"CUPROTEK"
	Soldering Flux	"FLOSOL"
COPPER, BERYLLIUM, AND COPPER ALLOYS	Brightening	"ACP BRIGHT DIP"
	Cleaning	"DEOXIDINE" "DURIDINE" "ACP RIDOLINES AND RIDOSOLS"
	Cleaning for Painting	"DEOXIDINE" "CUPROTEK"
	Coating Steel with Copper	"CUPRODINE"
	Corrosion Prevention	"CUPROTEK"
	Scale Modification	"RIDOXINE"
	Soldering Flux	"FLOSOL"
	Stripping Copper Coatings	"ACP COPPER STRIPPING SOLUTION"
GALVANIZED IRON, ZINC, AND CADMIUM	Cleaning	"DURIDINE" "ACP RIDOLINES AND RIDOSOLS"
	Corrosion Proofing	"ZINODINE"
	Paint Bonding	"ZINODINE"
	Phosphate Coating, in Preparation for Painting	"LITHOFORM"
	Soldering Flux	"FLOSOL"
IRON AND STEEL	Chromate Coating, in Preparation for Painting	"CROMODINE"
	Cleaning	"ACP RIDOLINES AND RIDOSOLS"
	Cleaning for Painting	"DEOXIDINE" "DURIDINE"
	Coating with Copper	"CUPRODINE"
	Drawing and Extrusion	"GRANODRAW"
	Paint Bonding	"CROMODINE" "DURIDINE" "GRANODINE" "PERMADINE" "THERMOIL-GRANODINE"
	Paint Stripping	"CAUSTIC SODA AND SOLVENT NO. 3"
	Phosphate Coating, in Preparation for Painting	"DURIDINE" "GRANODINE" "PERMADINE" "THERMOIL-GRANODINE"
	Phosphate Coating, to Protect Friction Surfaces	"THERMOIL-GRANODINE"
	Pickling with Inhibited Acids	"RODINE"
	Rust Prevention for Unpainted Iron	"PEROLINE"
	Rust Proofing	"PERMADINE" "THERMOIL-GRANODINE"
	Rust Removal—Brush, Dip, or Spray	"DEOXIDINE"
	Soldering Flux	"FLOSOL"
MAGNESIUM	Cleaning	"DURIDINE" "ACP RIDOLINES AND RIDOSOLS"
	Pickling	"RODINE (M-200)"
STAINLESS STEEL	Cleaning	"DEOXIDINE"
	Coating with Copper	"CUPRODINE"
	Pickle Polishing	"RODINE"
	Soldering Flux	"FLOSOL"

CHEMICALS ACP PROCESSES

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CHEMICALS ACP PROCESSES

ADVERTISER'S INDEX

Advance Solvents & Chemical Corp. ..... Front Cover
Alkydol Laboratories, Inc. ..... July
American Can Co. ..... July
American Chemical Paint Co. 58
American Cyanamid Co. ..... May
American Zinc Sales Co. ..... 3rd Cover
Arizona Chemical Co. 13
Armour Chemical Division ..... July
Atlas Electrical Devices Co. 32
Atlas Powder Company 47

Bakelite Company, a Division of Union Carbide and Carbon Corporation 9
Barrett Div., Allied Chemical & Dye Corp. 12
Binney & Smith Co. ..... 4th Cover
Blackmer Pump Co. 50

Godfrey L. Cabot, Inc. ..... July
John Calo Co. 52
Carbide & Carbon Chemicals Co., a Div. of Union Carbide & Carbon Corp. 54
Celanese Corp. 6
E. W. Colledge, G.S.A., Inc. 50
Commercial Solvents Corp. 57
Concord Mica Corp. ..... July
Continental Can Company 16
Cuno Engineering Co. ..... July

The Davies Can Co. 53
The Davison Chemical Corp. 38
Dicalite Division, Great Lakes Carbon Corp. ..... July
Dow Chemical Co. 39

Edgar Bros. Co. 11
Elgin Manufacturing Co. 53

Falk & Co. ..... July
B. F. Goodrich Chemical Co. 10
A. Gross & Company 44

Harshaw Chemical Co. ..... July
Hercules Powder Co. 41

Internatio Rotterdam, Inc. 49

Kentucky Color & Chemical Co. July
Lead Industries Association 8

Mapico Color Div., Columbian Carbon Corp. ..... 4th Cover

Naftone, Inc. ..... July
National Lead Co. ..... June
The Neville Company 45
Newport Industries, Inc. ..... July
Nuodex Corp. 14

Pacific Vegetable Oil Corp. 33
Pan American Refining Corp., Pan American Chemicals Div. July
Pennsylvania Industrial Chem. Corp. 51
Photovolt Corp. 56

Raybo Chemical Co. 55
R.B.H. Dispersion Division, Interchemical Corp. ..... July
Reichhold Chemicals, Inc. ..... 2nd Cover

St. Joseph Lead Co. 46
Schenectady Varnish Co. ..... July
Schneible Corp. 48
Seias Corp. ..... July
Sharples Chemicals, Inc. ..... July
The Sharples Corp. 34
Shell Chemical Corp. 3
Shell Oil Co. ..... June
Sindar Co. ..... July
Sparkler Manufacturing Company 48
Sun Oil Co. 42

Tennessee Eastman Co. 40
Thibaut & Walker ..... July
Titanium Pigment Corporation 15

Union Carbide and Carbon Corporation, Bakelite Company .. 9
Union Carbide & Carbon Corp., Carbide & Carbon Chemicals Co. 54
United Carbon Co. 56
U. S. Stoneware Co. 43

Velsicol Corp. 4

Whittaker, Clark & Daniels ..... July
C. K. Williams & Co. 35

high

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A high oil absorption Zinc Oxide having large Acicular Particles which gives heavy body

medium

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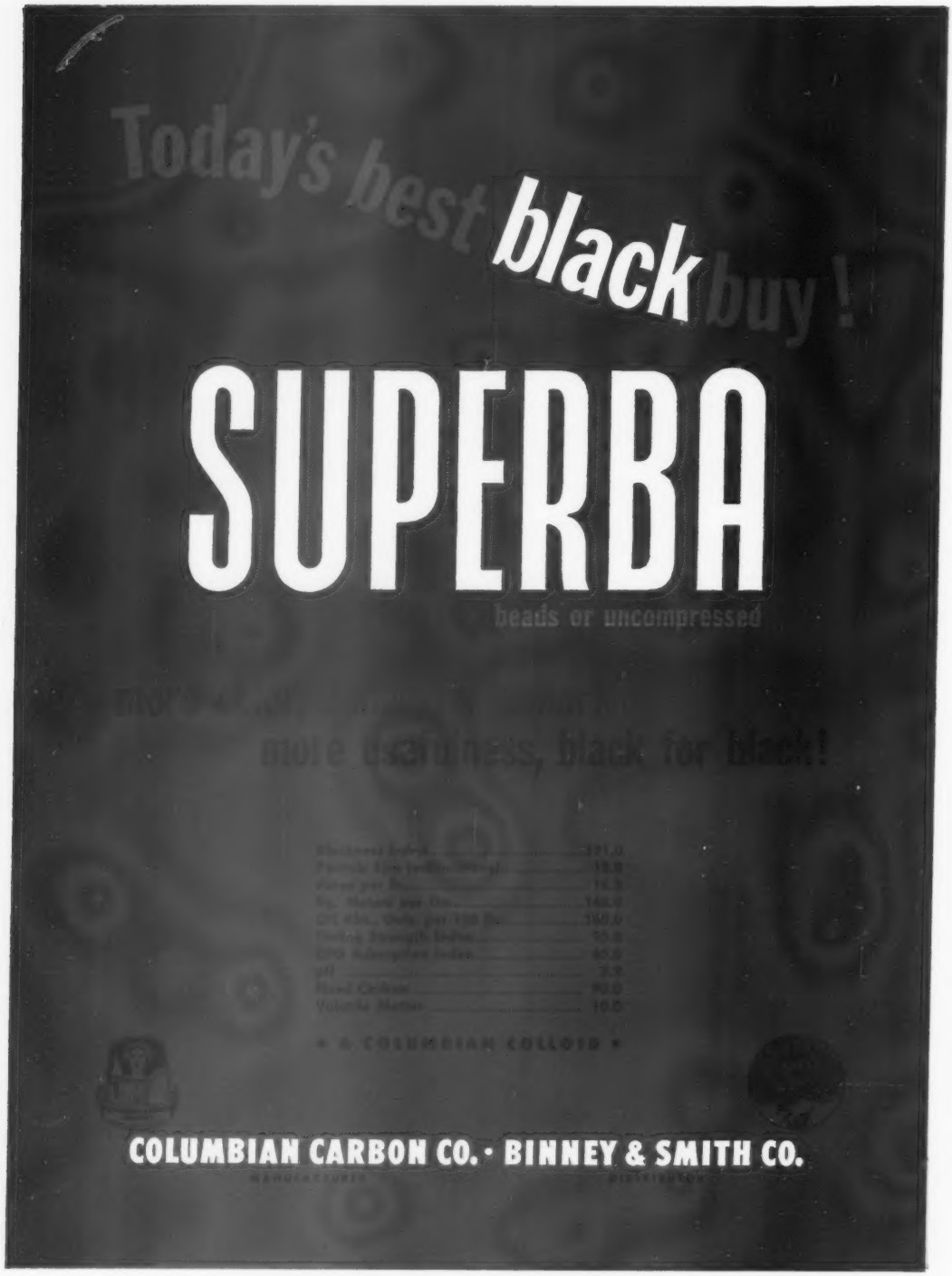
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